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AD 732253

USAAVLABS TECHNICAL REPORT 69-98

MEASUREMENT OF AERODYNAMIC FORCES ON AN OSCILLATING AIRFOIL

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By

Richard I. Windsor

AD No. ____
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March 1970

U. S. ARMY AVIATION MATERIEL LABORATORIES
FORT EUSTIS, VIRGINIA

CONTRACT DAAJ02-67-C-0017
WIND TUNNEL OPERATIONS DEPARTMENT
UNIVERSITY OF MARYLAND
COLLEGE PARK, MARYLAND

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Task 1F162204A13903
Contract DAAJ02-67-C-0017
USAAVLABS Technical Report 69-98
March 1970

MEASUREMENTS OF AERODYNAMIC FORCES ON AN OSCILLATING AIRFOIL

Final Report

Engineering Report No. 70-1

By

Richard I. Windsor

Prepared by

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for

U. S. ARMY AVIATION MATERIEL LABORATORIES
FORT EUSTIS, VIRGINIA

SUMMARY

A literature survey was conducted to determine the state of the art of measuring and predicting aerodynamic characteristics of oscillating airfoils. Results of this survey are presented in Appendix I as a correlation and tabulation of airfoil and finite wing experimental investigations. An extensive bibliography resulting from the literature survey is also presented.

Aerodynamic forces on a two-dimensional NACA 0012 airfoil oscillating sinusoidally in pitch were measured by two techniques. The forces were obtained from pressure measurements and by means of strain gage balances. Pressure measurements were made on the airfoil oscillating in pitch about the quarter-chord point at various mean angles of attack. Strain gage balance readings were obtained for models with pitch axis located at 25, 37, and 50 percent chord points oscillating about various mean angles. Direct force measurements were employed in an effort to obtain drag data.

Test results obtained by the two measuring techniques exhibit excellent agreement over the test range of oscillating frequencies. At low mean angles where the instantaneous angle of attack does not exceed the steady state stall angle of attack, the data compare very well with incompressible theory. At higher mean angles, the pitch oscillations were found to increase the stall angle of attack with corresponding increase in the normal force and pitching moment coefficients. Mean values of drag were found to increase with increasing oscillating frequency. The oscillatory amplitude of drag tended to decrease as oscillating frequency increased.

Instantaneous pressure distributions are presented for representative oscillating conditions.

FOREWORD

The results from the oscillating airfoil tests are presented in this report. The project was performed under Contract DAAJ02-67-C-0017 (Task 1F162204A13903) under the technical cognizance of Patrick Cancro, Project Engineer, U. S. Army Aviation Materiel Laboratories.

The cooperation and assistance of Stanley E. Pearson of NASA-Langley Research Center with the pressure instrumentation are gratefully acknowledged.

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LIST OF SYMBOLS

C	wing chord, ft
C_A	airfoil axial force coefficient, positive downstream
C_D	airfoil drag coefficient, positive downstream
C_L	airfoil lift coefficient, positive up
$\left\lvert \frac{dC_L}{d\alpha} \right\rvert$	absolute magnitude of fundamental component of oscillating airfoil lift coefficient per radian
C_M	airfoil pitching moment coefficient about pitch axis, positive nose up
$\left\lvert \frac{dC_M}{d\alpha} \right\rvert$	absolute magnitude of fundamental component of oscillating airfoil pitching moment coefficient per radian
C_N	airfoil normal force coefficient, positive up
$\left\lvert \frac{dC_N}{d\alpha} \right\rvert$	absolute magnitude of fundamental component of oscillating airfoil normal force coefficient per radian
C_P	pressure coefficient
f	frequency, Hertz
k	reduced frequency, $\omega C/2V$
$\lvert M \rvert$	absolute magnitude of fundamental component of oscillating pitching moment about pitch axis, ft-lb
$\lvert N \rvert$	absolute magnitude of fundamental component of oscillating normal force, lb
q	dynamic pressure, pounds per square ft
R	Reynolds number
S	model area (span x chord), sq ft

V	velocity, fps
X	airfoil chordwise coordinate, measured from leading edge, ft
α	instantaneous angle of attack, deg
$\Delta\alpha$	oscillatory angle of attack, deg (except when used in defining oscillatory derivatives)
$\bar{\alpha}$	mean angle of attack about which airfoil is oscillated, deg
ρ	density, slugs per cubic ft
φ_L	phase angle by which lift leads the motion, deg
φ_M	phase angle by which pitching moment leads the motion, deg
φ_N	phase angle by which normal force leads the motion, deg
ω	circular frequency, $2\pi f$, rad per sec
	Bars indicate mean value over an oscillation cycle

INTRODUCTION

In the past, considerable effort has been expended, both theoretically and experimentally, to determine the aerodynamic characteristics of oscillating airfoils. A survey of the literature in this field was undertaken to determine the state of the art and the extent of previous experimental investigations. The primary emphasis of the survey was placed upon experimental investigations of two-dimensional oscillating airfoils. An attempt to correlate the results of these investigations was undertaken.

Results of the survey indicated two major problem areas in experimental oscillating airfoil investigations: that of obtaining the desired motion and that of measuring the aerodynamic forces. In regard to the first problem, the motions of primary interest in the past have been pure sinusoidal rotation about the pitch axis, pure sinusoidal translation, and a combination of those two. One reason for interest in sinusoidal motion was that it could be compared with existing theory. Recently there has been an interest in a combined rotational and translational motion which would simulate the motion experienced by a section of a helicopter rotor blade as it rotates. There were no experimental results uncovered during the literature search dealing with this particular problem. In the past, some rather ingenious devices have been used in an effort to overcome the problem of measuring the aerodynamic forces. The methods used fall mainly into two categories: that of measuring forces directly and that of measuring pressures and obtaining forces by integration. Both methods have their advantages and disadvantages. In order to investigate measuring techniques, an experimental test was undertaken using sinusoidal motion.

Aerodynamic forces on an NACA 0012 airfoil oscillating sinusoidally in pitch were measured by two techniques. The forces were obtained from pressure measurements and by means of strain gage balances. By using two methods of obtaining the oscillating forces, the advantages, disadvantages, and limitations of the methods could be compared while keeping the airfoil profile, test installation, and testing techniques consistent. Pressure measurements were made on the airfoil oscillating in pitch about the quarter-chord point at various mean angles of attack. Strain gage balance readings were obtained with the model oscillating about pitch-axis locations of 25, 37, and 50 percent chord for various mean angles.

Results obtained from the two methods are compared with each other and with two-dimensional, incompressible flow, oscillating airfoil theory. Testing at different pitch-axis locations allowed an extension of the comparison with theory and correlation with the work of other experimenters.

Mean angles were chosen so that in some cases the airfoils were oscillating in and out of the stall condition. There is no satisfactory theory for this condition, but it is a situation that arises in helicopter rotors where, at certain azimuth locations, portions of the rotor blade exceed the stall angle of attack. While the Mach number and Reynolds number employed in the experimental investigation may be somewhat low for application to helicopter rotor theory, the oscillating characteristics presented for the stall region and the instantaneous pressure distributions obtained may offer some insight into the rotor problem.

LITERATURE SURVEY

A literature survey was conducted to determine the state of the art of measuring and predicting aerodynamic characteristics of oscillating wings and airfoils. During the course of the literature survey, it became evident that considerable effort has gone into the investigation of unsteady aerodynamics. A complete coverage of this field is beyond the scope of this report. Therefore, the primary thrust of the survey was directed toward determining what had been done in the area of two-dimensional oscillating airfoil investigations. This information was needed to provide a background for the experimental investigation of techniques for determining the aerodynamic forces on an oscillating airfoil. The scope of the survey was wider than that dictated by the ultimate experimental effort, in order to provide the following:

1. A bibliography covering the entire topic of oscillating wings and airfoils (subsonic, compressible, nonuniform flows, etc.).

2. Background information on the experimental techniques of unsteady aerodynamic measurements employed by various investigators.

3. Theoretical means for predicting results.

Results of the literature survey are presented in Appendix I and the Selected Bibliography. Appendix I presents an attempt to correlate the results of various low-speed investigations of oscillating two-dimensional airfoils and a summary of airfoil and finite wing experimental investigations. Due to the large number of parameters involved in the investigations (oscillating frequency, oscillating amplitude, mean angle of attack, test Reynolds number, airfoil profile and pitch-axis location) and the type of data reported, it was quite difficult to make any direct comparisons or correlation. All reports resulting from the literature survey which are not included in the summary of Appendix I are listed in the Selected Bibliography.

EXPERIMENTAL PROGRAM

An experimental program was conducted to measure the aerodynamic forces on a two-dimensional airfoil undergoing forced sinusoidal oscillations in a wind tunnel. The forces were determined by means of pressure measurements and direct force measurements using strain gage balances. A NACA 0012 profile was chosen for the airfoil so that results could be compared with previous experimental investigations.

DESCRIPTION OF APPARATUS

Test Facility

Tests were conducted in a two-dimensional open circuit wind tunnel. This tunnel has a capability of 110 mph velocity through a 1.5-foot by 3.875-foot test section. These dimensions are one-half scale of the 3-foot by 7.75-foot test section of the University of Maryland 7.75-foot by 11-foot low-speed wind tunnel. The velocity distribution in the test section is very uniform, with a variation of less than 0.5 percent of the mean velocity in the test region. The turbulence factor as determined by a 4.5-inch sphere is 1.08.

Oscillating Mechanism

An oscillating drive mechanism was designed to meet the following requirements:

1. Oscillate the model in pure rotation (pitch).
2. Oscillate the model in pure translation (heave).
3. Oscillate the model in a combination of rotation and translation.
4. Be adaptable to the 1.5-foot by 3.875-foot wind tunnel and the 3-foot by 7.75-foot test section of the larger wind tunnel.

The literature survey established the following design capabilities:

1. Rotation
    a. Frequency range, 2 to 30 Hertz
    b. Amplitude of 10 degrees from mean angle of attack

2. **Translation**

   a. **Frequency range, 2 to 30 Hertz**

   b. **Amplitude of 5 inches**

These design requirements and capabilities were greater than the dictates of the immediate experimental program. Details of the design are presented in a separate report.[1] A brief summary and principles of operation are presented here for convenience.

In order to meet the requirements of pure rotation, pure translation, and combined motion, the oscillator was constructed with separate pitch and heave shafts with the capability of gearing them together for combined motion. The shafts have flywheels on each end with adjustable crank pins driving Scotch-yoke arrangements. Thus, the two-dimensional model is driven from both ends. This eliminates twist of the model that may exist if it is driven from one end only. The flywheels were designed to maintain a speed variation of less than 2 percent at the top oscillating speed of 30 Hertz. The crank pin had a maximum travel of 5.0 inches from the centerline of the shaft. This travel was sufficient to provide the design rotation and translation amplitudes. The pitch and heave shafts were driven by a 10-horsepower variable-speed motor drive. This drive provided oscillating frequency ranges of 2 to 15 Hertz and 4 to 30 Hertz.

The oscillating mechanism was designed to be mounted under the test section of the small two-dimensional tunnel. The forward or heave shaft was directly under and parallel to the model pitch axis. The heave motion was transmitted by a vertical shaft attached to the Scotch-yoke. The rear or pitch shaft was located 18 inches downstream from the heave shaft. The pitching motion was transferred to the model by means of a vertical shaft connected to the Scotch-yoke mechanism and a pitch arm connecting the vertical shaft to the model pitch axis. In order to insure sinusoidal motion, the pitch arm was fitted with a cam follower which rode in a horizontal slot attached to the top of the vertical pitch member. The general arrangement of the drive mechanism, 1.5-foot by 3.875-foot wind tunnel, and model is shown in Figure 1. Figure 2 illustrates the details of the pitch mechanism.

Model Construction and Instrumentation

There are two main considerations in the design of airfoils for forced oscillation testing. First, the weight must be held to a minimum to reduce the inertia loads, and second, the structure should be rigid to keep deflections as small as possible. These two requirements are in opposition to each other, and a reasonable trade-off between the two is required.

In an effort to meet these requirements, it was decided to construct the models from plastic foam. For this purpose, a wooden airfoil of NACA 0012 profile having a 1-foot chord and a 1.5-foot span was constructed. A plaster mold was cast from this model. With this mold it became a simple matter to make models using a foam-in-place rigid plastic. The result was a lightweight rigid model having a very smooth surface. The first models made by this method were somewhat unstable. That is, the profile shape changed after a period of time. This problem was overcome by allowing the models to cure in the mold for several days. Several models were cast. Some were used for checking out the method and improving upon the technique. Four were constructed for the experimental investigation. The models used during the tests consisted of one pressure model and three force models. These models are discussed in the following sections:

Pressure Model

Model weight is not as serious a problem for the pressure model as it is for the force models. Whereas the inertia loads arising from the model weight do impose a burden on the drive mechanism, they do not affect the forces obtained from the integration of the pressure readings. Therefore, the limiting weight factor is the capacity of the drive system. This is fortunate since other problems, such as mounting pressure transducers, arise in conjunction with the pressure model that tend to increase the inertia loads.

In determining forces from pressure measurements, ten orifices on both upper and lower surfaces were considered to be a minimum number for the accuracy desired. If forces are the only interest, then differential pressure transducers could be used and only ten would be required. However, if instantaneous pressure distributions are desired, twenty transducers would be needed. Since transducers and their associated instrumentation are expensive and such large numbers are difficult to mount in small models, it was felt that any method of reducing the number of transducers required was worthy of consideration.

One method of reducing the number of transducers required that appeared promising was the use of a scanning valve with a single transducer. This would require pressure tubing running from each orifice on the model to the scanning valve. To employ such a method would require a knowledge of the pressure attenuation and phase lag associated with the system. In order to acquire this knowledge, an investigation of the effects of tubing on the remote reading of oscillating pressures was undertaken. The report of this investigation is presented in Appendix II. It was concluded from the investigation that

it would be impractical to determine the instantaneous local oscillating pressure from remote readings using this method.

For this investigation, it was desired to obtain instantaneous pressure distributions. Twenty-four differential pressure transducers of the NACA type described by Patterson[2] were used, twelve on the upper surface and twelve on the lower surface. A Statham Model PL131TC transducer was employed to obtain the leading edge pressure, resulting in a total of 25 pressure orifices. The range of these transducers was ±2 psid. An aluminum block was machined to receive the NACA type transducers in two rows of twelve each, stacked one transducer over the other, connected on the reference pressure side to a common reference pressure passage. The transducers were placed in the block and secured by a cover plate which contained short tubes leading to the pressure orifices on the model surface. Details of this installation are presented in Figure 3. This block containing the pressure transducers was mounted at the midspan point of the pitch-axis shaft. The shaft and the transducer block were then positioned in the mold, and the model was cast around them. The tubing for the pressure orifices was then worked down to the model contour. Thus, the transducers were embedded in the model and and could not be removed without destroying the model itself. The pressure orifices were located at 0, 0.75, 2, 5, 10, 15, 20, 25, 35, 45, 60, 75, and 90 percent chord. The transducer for the leading edge orifice was mounted in the model separately from the other transducers but was connected to the common reference pressure.

Prior to installing the transducers in the model, the system was checked for leaks and feedback through the reference pressure passage. That is, the system was checked to insure that oscillating pressures at one transducer did not interfere with pressures recorded on adjacent transducers. This was checked by connecting all orifices except one to an oscillating pressure (motor-driven piston) of the maximum anticipated test pressure and observing the output signal of the remaining transducer. There was no discernible interaction observed.

Commercially available carrier equipment was used with the transducers to drive recording galvanometers. Two recorders were used, one for the upper surface pressures and the other for the lower surface and leading edge pressures. The frequency response of the galvanometers was flat up to 60 Hertz. The frequency response of the transducers was equal to or better than the galvanometers.

Force Model

Force models were constructed with pitch-axis locations of 25, 37, and 50 percent chord. Construction of these models was relatively simple. A spar was machined from 1/2-inch aluminum plate, located in the mold to provide proper pitch-axis location, and the plastic foam was poured around the spar to form the model. Each spar was designed so that the combined weight of the spar and plastic foam would locate the model center of gravity very nearly on the pitch axis.

To measure the aerodynamic forces on these models, two strain gage balances were designed and constructed. The balances were mounted one on each end of the model. Each balance measured the model normal force, axial force, and pitching moment. These measurements were accomplished by means of twelve strain gages arranged in three bridges of four each. The physical arrangement of the strain gages is depicted in Figure 4, while the electrical arrangement is presented in Figure 5.

Design of the force balance was complicated by the fact that the balance has to carry the inertia loads as well as the aerodynamic loads. The moment inertia loads become quite large as the oscillation frequency increases. A problem arises in trying to design for the sensitivity required for axial force measurements and still have the capability of transmitting the large moments. For oscillating force measurements, an additional problem of avoiding natural frequencies in the desired operating range arises. With these problems in mind, it was decided to design the balance for an oscillating frequency limit of 15 Hertz in anticipation that if the balance design were satisfactory it could be scaled up for later tests at higher frequencies.

The same carrier equipment and galvanometers used for the pressure instrumentation were used to record the force data. For the force data, only one recorder was required since only six channels were needed for the two balances.

TESTING PROCEDURE AND ANALYSIS OF DATA

All testing was done in the 1.5-foot by 3.875 foot wind tunnel at a dynamic pressure of 28.205 pounds per square foot and an indicated airspeed of 105 mph. Actual test conditions (tunnel temperature and pressure) resulted in velocities ranging between 106 and 108 mph. The Reynolds number based upon the model chord length was 0.93×10^6. Model oscillating frequency was varied from 2 to 15 Hertz (frequency parameter varied

from 0.03 to 0.3) in nine steps for each test condition listed in Table I. Tunnel wall corrections were not applied to the data.

TABLE I. SUMMARY OF TEST CONDITIONS

Model	Pitch-Axis Location, % Chord	$\bar{\alpha}$ Deg	$\Delta\alpha$ Deg
Pressure	25	-0.20	4.00
		-0.20	6.00
		5.80	6.00
		13.83	6.00
		18.00	6.00
Force	25	-0.35	6.08
		5.81	6.08
		13.56	6.08
	37	-0.31	6.08
		5.84	6.08
		13.76	6.08
	50	-0.02	6.08
		6.22	6.08
		14.25	6.08

Pressure Model

Before testing the pressure model, the pressure transducers were calibrated. This calibration was accomplished by connecting the reference pressure manifold to an alchohol manometer and applying various pressures to the system. By recording the manometer reading and taking an oscillographic record for each pressure, the entire system was calibrated using the alcohol manometer as a standard. Since the tunnel dynamic pressure is determined by an alcohol manometer using the same fluid, the pressure coefficients, $\Delta P/q$, are also independent of specific gravity of the alcohol. The reference pressure manifold provided a simple means of calibrating the system and spot-checking the calibration prior to each run.

Having calibrated the transducers, steady state data were obtained for angles of attack varying from -4 degrees to 30 degrees in increments of 2 degrees. Pressure data were recorded for each point. Data for the

individual orifices were read from the oscillograph record and punched into IBM cards using an oscillograph chart reader. The cards were processed by computer to obtain pressure coefficients, normal force, and pitching moment. Normal forces were obtained by integrating the pressure coefficients using a trapezoidal method. Both horizontal and vertical contributions of the pressures were considered in the integration to obtain moments. For purposes of computation, the trailing edge pressure was assumed to be zero.

Before conducting the oscillating test, the transducers were checked for gravitational effects on the diaphragm due to model oscillations. To accomplish this, the pressure orifices were taped at the model surface. The model was oscillated through the speed range, and the oscillograph traces were observed. With the exception of the transducer located at 25 percent chord on the upper surface, there was no indication of any gravitational effects. The transducer mentioned apparently had a loose connection or part, for at frequencies above 8 or 10 Hertz, the signal became erratic. Below this point there was no indication of any gravitational effects.

In order to check for variations in tunnel speed due to model oscillations, a pressure transducer was connected to the piezometer ring just forward of the test section. The signal from this transducer was observed with the tunnel operating, and the model oscillations varied through the test range. There was no indication of unsteadiness arising from the oscillating model.

Being satisfied that there were no extraneous signals due to the design of the system and operating conditions, the oscillating tests listed in Table I were conducted. These tests were chosen so that the effects of oscillating amplitude and mean angle of attack could be determined. The higher mean angles were chosen so that one would be in the vicinity of the steady state stall angle of attack and the other would be well within the stall region. For the high mean angle of attack tests, the pressure transducers were biased by applying a negative pressure to the reference pressure manifold. This shifted the mean values so that the oscillating values would not exceed the deflection limitations of the recording equipment. In this way, the sensitivity of the oscillating signal was not reduced, as it would be if the signal had been attenuated to keep the deflections down.

In order to relate the pressure signals to the model motion, a signal from a potentiometer attached to the pitch shaft was added to both recorders. A timing mark was applied to the position signals to tie the two records together.

Records from the oscillating tests were read and punched into cards in the same manner as the steady state data. Twenty-four points on each of

three consecutive cycles were read for the mean angles of attack for which the instantaneous angle of attack did not exceed the steady state stall value. Instantaneous normal forces and pitching moments were computed for these points. These values were then plotted against air-foil angular position. The magnitudes of the oscillating components of normal force and pitching moment and the phase relationships were measured from these plots. For the two higher mean angles of attack, only one cycle was read and computed. The nominal $\Delta\alpha$ value was set on the oscillating mechanism; however, due to deflections in the system, the actual value of $\Delta\alpha$ was higher than the nominal value, and the difference increased with increased oscillating frequency. The actual value of $\Delta\alpha$, which was determined by measuring the travel of the trailing edge of the model at various oscillating speeds, was considered in the computation of the absolute magnitudes of the normal force and pitching moment.

Force Models

Calibration of the strain gage balances was undertaken after completion of the pressure testing. The balances were calibrated in place by substituting an aluminum plate, similar to the force model spar, for the model. The plate was fitted with attachments for loading normal force, axial force, and pitching moments. The balances were loaded in increments of the primary loads to values slightly higher than the anticipated test loads. In addition to the primary loads, combined loads were applied to determine balance interactions. No second-order interactions of any consequence were detected from the results of the combined loads tests. Interaction equations were written for each balance to account for the primary interactions. Sensitivity of the normal force and pitching moment was very good, but axial force was less sensitive than was desirable.

The force model with the pitch axis at 25 percent chord was installed to check out the system, oscillating mechanism, balances, and instrumentation. At low oscillating frequencies, the oscillograph traces were quite smooth. As the frequency of oscillation was increased, a higher frequency disturbance appeared on the traces. The magnitude of this disturbance increased as oscillating frequency increased and reached alarming proportions at the highest frequencies. This disturbance was found to be arising from the excitation of the natural frequency of the model-balance system. The natural frequency in the pitch mode was approximately 130 Hertz while that of the axial force mode was about 30 Hertz. Considerable effort was expended in trying to reduce the magnitude of this disturbance by damping and by increasing the natural frequency so that it would not be excited as readily. Some damping was achieved by using heavier supports and a bearing on the pitch shaft as close to the balance as possible. The only way the natural frequency could be increased was to decrease the model mass or increase the stiffness of the balances. The weight of the

model (2.63 pounds) could not be decreased appreciably. Since the sensitivity of the axial force balance was already less than that desired, the balance could not be stiffened. Therefore, it was decided to proceed with the tests and depend upon harmonic analysis of the data to provide meaningful results. Fortunately when the model was oscillated with the wind tunnel running, there was an appreciable damping of the natural frequency signal.

Since the force balances measure the inertia loads as well as the aerodynamic forces, it was necessary to determine these loads and subtract them from the total values to obtain the desired aerodynamic characteristics. An attempt was made to oscillate the model in a vacuum to measure the moments of inertia independent of the virtual mass effect of the air. The model was oscillated in a tank at atmospheric pressure and then with the tank evacuated to a pressure of 27 inches of mercury below atmospheric. Leakage around the shaft prevented the attainment of a higher vacuum. There was no measurable difference between the results of these two tests. Therefore, the virtual mass effect of the air was assumed to be negligible, and the inertia loads were determined by oscillating the model in still air.

The procedure of testing the three force models was the same for each one. First the models were mounted in the tunnel on the oscillating mechanism. Known loads were applied to the model to check the balance calibrations. Then steady state wind-on runs were made varying the angle of attack from -4 degrees to 30 degrees, data being recorded for 2-degree increments through the stall angle and 4-degree increments above stall. After obtaining the steady state data, the desired mean angle was set on the oscillator and the model was oscillated through the frequency range with the wind off to obtain the inertia loads. Data were recorded at nine different oscillating frequencies. Immediately after recording the inertia loads, the tunnel was brought up to speed, the model was oscillated at the same frequencies employed for the inertia loads, and data were recorded.

Oscillograph records were read and punched into cards in the same manner as the pressure data. In this case, only seven channels were required, three for each balance and one for a position trace. The data were then processed by computer. Forces and moments were computed for the balances using the interaction equations. These results for the two balances were then averaged to obtain the model normal force, axial force, and pitching moment (in all cases pitching moment is about the pitch axis) acting on the model. A 24-point harmonic analysis was then performed on both inertia data and wind-on data. The results of the inertia analysis were subracted from the wind-on results to obtain the final aerodynamic coefficients and phase relationships.

As was mentioned in the discussion on the pressure model, actual $\Delta\alpha$

values were determined by measurements. The deflection of the model was also measured with a pitching moment applied. The correction to the $\Delta\alpha$ value obtained from the two methods exhibited excellent agreement. All of the nominal $\Delta\alpha$ values were corrected for deflections which were a function of the oscillating frequency.

RESULTS AND COMPARISON OF DATA

Results of the oscillating tests conducted at low mean angles of attack (approximately 0 and 6 degrees) are presented in coefficient form defined as follows:

$$\left|\frac{dC_N}{d\alpha}\right| = \frac{|N|}{1/2\ \rho V^2 S\ \Delta\alpha}$$

and

$$\left|\frac{dC_M}{d\alpha}\right| = \frac{|M|}{1/2\ \rho V^2 Sc\ \Delta\alpha}$$

where $\Delta\alpha$ is measured in radians.

For mean angles where instantaneous angles of attack exceed the steady state stall angle of attack, representative data are presented as instantaneous coefficients versus instantaneous angle of attack.

STEADY STATE RESULTS

Steady state C_N and C_M variations with α are presented in Figure 6. The slopes of the C_N versus α curves for all four models show excellent agreement. However, there is considerable variation of the curves in the region near stall. This variation points up some of the problems associated with airfoil stall. All of these models were cast from the same mold and tested in the same facility. Strictly speaking, the steady state C_N versus α curves should be the same. It is assumed that slight irregularities at the leading edge of the surface cause the stall to be precipitated differently on each of the four models. In addition to the problem of initial stall is the problem of the unsteady and irregular nature of the flow over the model after it has stalled. Oscillograph records taken in the stall region show rapid fluctuations of the order of 30-50 percent of the maximum recorded normal force. Data presented in Figure 6 for the stall region are average values of these fluctuations. The discrepancies noted in this relatively simple case of steady state stall are emphasized to illustrate the problem of determining maximum C_N, stall angle of attack, and aerodynamic characteristics after the inception of stall.

PRESSURE MODEL RESULTS

Normal Force and Pitching Moment Coefficients

The magnitude and phase of the oscillatory normal force and pitching moment coefficients for low mean angles of attack are presented in Figures 7 and 8 as functions of reduced frequency. For purposes of comparison, the theoretical normal forces and pitching moments calculated from Theodorsen's equations[3] are shown along with the measured data. Measured data are presented for two values of mean angle of attack and two values of oscillating amplitude. All of the data shows excellent agreement with theory except for the moment phase angles. The oscillating amplitude of the pitching moment is quite small with the pitch-axis located at 25 percent chord, especially at low oscillating frequencies. This presents a problem in trying to measure phase angles with any degree of accuracy and probably accounts in large measure for the scatter in pitching moment phase data and the discrepancy with theory. Oscillatory amplitudes of normal force and pitching moment coefficients and phase relationships appear to be independent of mean angle of attack and amplitude of oscillation as long as the instantaneous value of angle of attack does not exceed the steady state stall value.

Instantaneous normal force and pitching moment coefficients are presented in Figures 9 and 10 as functions of instantaneous angle of attack for two values of mean angle of attack at representative test values of reduced frequency. Figure 9 presents data for mean angle of attack $\bar{\alpha}$ of 13.80 degrees, which is close to the value of α for maximum formal force. Figure 10 is for a value of $\bar{\alpha}$ of 18 degrees, which is well above the steady state stall angle of attack. Steady state normal force and pitching moment are included in Figures 9 and 10 for comparison with the oscillatory values. In Figure 9 it is observed that at the lowest values of reduced frequency, the model stalls at an angle of attack slightly greater than the steady state stall angle. The pitching moment increases in magnitude to a large negative value that is considerably greater than the steady state stall value. With increasing values of k and reduced frequency, the angle of stall for the normal force is delayed until at the highest value of k, there is essentially no indication of stall. A maximum value of C_N of approximately 1.8 is obtained at the highest value of k. This is an increase of about 40 percent over the steady state value of maximum C_N. The increase in negative C_M at stall decreases as k increases and approaches the unstalled condition at the highest frequency. Figure 10 indicates much the same trends as Figure 9. As k increases, the angle for C_N stall increases. At the highest value of k, the maximum value of C_N is not reached until after the maximum value of α has been obtained. The maximum value of C_N (2.29) for the highest oscillating frequency exceeds the steady state value by approximately 80 percent. The pitching moment

stalls somewhat sooner than the normal force in all cases. As k increases, the pitching moment at stall increases in magnitude until a value of -0.33 is reached at k = 0.191. With further increase in k, this large negative moment appears to decrease in a manner similar to the case with $\bar{\alpha}$ = 13.80 degrees.

Instantaneous Pressure Distributions

Instantaneous pressure distributions are presented in Figures 11 through 16 for some representative conditions. Figures 11 and 12 present pressure distributions for $\bar{\alpha}$ = 5.80 degrees at the extremes of the frequency range. Data are presented for an instantaneous angle of attack to compare the instantaneous pressure distributions for that portion of the cycle where α is increasing with the pressure distribution for the same angle when α is decreasing. Figure 11 is representative of the low-frequency end of the data summarized in Figures 7 and 8. From Figure 11, it is seen that there is very little difference between increasing α and decreasing α. This is in agreement with Figures 7 and 8, which indicate a very small normal force phase angle at low frequency and very small pitching moments. For the high-frequency data of Figure 12, there is a noticeable difference in the normal force (area under curve) and pitching moment (area distribution) between increasing and decreasing α. The normal force is greater for α increasing than for α decreasing. This is indicative of the leading phase angle shown in Figure 7. The pitching moment, essentially zero for α increasing, becomes positive with decreasing α, which is indicative of the pitching moment phase lag shown in Figure 8. The pressure distributions also indicate a decrease in C_N magnitude between the lowest and highest reduced frequencies (Figure 7 and 8 respectively), but this is not so obvious without overlaying one figure with the other.

Figures 13 through 15 present instantaneous pressure distributions for selected values of α for low, medium, and high test frequencies respectively. The mean angle $\bar{\alpha}$ for these figures was 13.80 degrees. Data are presented for instantaneous values of α near the mean and near the maximum values. Figure 13 indicates that the model stalls before the maximum angle of attack is reached at the low oscillating frequency. For the midfrequency value presented in Figure 14, the model stalls at or very near the maximum angle of attack, as indicated by the stalled condition for decreasing α. Figure 15 indicates that the model is essentially unstalled. These figures aid in interpreting the results in Figure 9.

Figure 16 presents some very unusual pressure distributions obtained from the highest oscillating frequency test for a mean angle of attack of 18.00 degrees. Data are presented for several instantaneous angles of attack over the positive half cycle of $\Delta\alpha$. These pressure distributions are

directly related to the instantaneous force and moment data presented in Figure 10 for the highest frequency. It is interesting to note in Figure 16 that C_N increases up to and beyond maximum angle of attack even though the peak suction pressures near the leading edge drop off. The relatively large negative pressure coefficients existing over the airfoil upper surface aft of the 25 percent chord are responsible for the large negative moments shown in Figure 10. Also of interest is the flat pressure distribution over the first 20 percent of the lower surface of the airfoil.

Figure 17 presents instantaneous pressure distributions for the lower surface leading edge of the airfoil for various instantaneous angles of attack, with increasing and decreasing α for oscillations about a mean angle of 5.80 degrees. The irregular nature of the distributions presented here was not noted for any of the other test conditions. These irregularities may be indicative of a vortex formation or some other flow peculiarity. In the future, it may be desirable to do some sort of flow visualization on the airfoil oscillating at this condition.

Representative pressure distributions were chosen for presentation in this report. However, since there is little instantaneous experimental pressure distribution data available, it was felt that tabulated coefficients should be presented for one cycle of each test condition. These coefficients are listed in Appendix III.

FORCE TEST RESULTS

Normal Force and Pitching Moment Coefficients

Magnitude and phase of the oscillatory normal force and pitching moment coefficients for the model oscillating about the 25 percent chord axis at low mean angles of attack are presented in Figure 18 and 19. As was the case with the pressure model, the experimental data agree well with theory except for the moment phase angles. The moment phase data show reasonable agreement at the highest values of k, but diverge from theory at the lower k values, tending toward zero phase angle at k equal zero. Admittedly, the accuracy of the pitching moment data in this region leaves much to be desired, but there appears to be a definite trend in both sets of data. An error of just two counts of pitching moment (.002) can produce an error of greater than 10 degrees phase angle in the low k region due to the small magnitudes of the moment. But it would be expected that errors would produce scatter and not such a noticeable trend.

Oscillatory coefficients for the model oscillating about the 37 percent chord are presented in Figures 20 and 21. There is excellent agreement between measured values and theory except for the moment phase angles at the higher k values. Here there is a tendency to diverge from theory,

with measured phase angles being less than the theoretical values.

Data presented in Figures 22 and 23 for oscillations about the 50 percent chord also exhibit excellent agreement with theory. The measured moment values agree very well with theory, but there still appears to be a tendency to diverge at the higher reduced frequencies, as was evidenced in the case of the 37 percent pitch axis.

Drag Coefficients

As was mentioned previously, the drag balance was not as sensitive as was desired. An error in reading the oscillograph record of .01 in. was equivalent to .0030 (30 counts) in drag coefficient. For the 0012 airfoil tested, this is approximately 50 percent of the minimum drag. This low sensitivity made it difficult to obtain reasonable steady state data at low angles of attack where the drag is quite low. In addition to the sensitivity problem, a temperature problem existed on the drag balances. This apparently comes from the wide spacing of the strain gages in the drag bridge (see Figure 4). The carrier voltage heats the gages. The gages are then cooled by air circulating around them when the tunnel is operating. Some air can circulate since there is a small gap between the model and the tunnel wall. This circulation of air causes unequal cooling at the drag strain gages. This cooling is negligible on the pitching moment and normal force bridges. This temperature shift varied on the three models tested, being greatest on the 25 percent chord pitch axis model and negligible on the 50 percent chord pitch axis model. A test technique eliminated most of this temperature drift. The tunnel was brought up to speed and allowed to run until the drag values stabilized. Then the tunnel was shut down, wind-off zeros were taken, and the tunnel was immediately started again. The small remaining error (arising from the finite time required to stop all flow in the tunnel) was sufficient to cause problems due to the low sensitivity of the balance. This problem was especially aggravating in trying to obtain steady state and mean values of drag. It did not affect the oscillating values, since there was negligible drift during the time required to record the oscillating data. However, obtaining the oscillating data is complicated by the excitation of the natural frequencies of the balances.

In spite of the difficulties, some drag results were obtained and are presented in Figures 24 and 25. Drag coefficients were obtained from the axial force data by means of the following relationship:

$$C_D = C_A \cos\alpha + C_N \sin\alpha$$

Unlike the normal force prior to stall, drag variation is not linear with angle of attack. Therefore, axial force is not linear with angle of attack. The axial force data obtained from the harmonic analysis indicate that the

first three harmonics are significant. Higher harmonics are negligible, except those arising from the natural frequencies which are unwanted. The first and second harmonics contain most of the data of interest. The third harmonic was small in comparison to the first two and was essentially constant. Since it was constant with k and relatively small, neglecting it does not alter the drag picture. Data presented in Figure 24 are for a mean angle of attack of zero degrees. Figure 25 presents the data for a mean angle of approximately 6 degrees. Oscillating amplitude is a nominal 6 degrees in each case. Oscillating drag is entirely different for the two mean angle conditions. In the case of zero mean angle, drag increases with both positive and negative angles of attack. Since the drag variation with angle of attack is fairly flat in this low α region, the drag results would be expected to be essentially a double-frequency sinusoid. For a nominal mean angle of 6 degrees, the drag decreases to a minimum value for $-\Delta\alpha$ and increases to a maximum for $+\Delta\alpha$. The drag curve over this range is nonlinear, with C_D increasing more rapidly with α at the higher angles of attack. Therefore, it would be expected that drag would be a nonsinusoidal curve of the oscillating frequency.

Results of the harmonic analysis of the zero mean angle of attack data show very small first harmonic and third harmonic contributions to the drag. The magnitude of the first harmonic data is probably due to the fact that the mean angle of attack was not exactly zero degrees. The second harmonic data are presented along with the mean drag coefficient in Figure 24 as a function of oscillatory frequency parameter. The mean value of drag is seen to increase rapidly with k. The second harmonic is constant up to a value of k = 0.2, then increases sharply. The sharp increase in the second harmonic is probably due to the excitation of the balance natural frequency, since the natural frequency in the drag direction is approximately 30 Hertz, which is the second harmonic of the oscillating frequency of 15 Hertz at k = 0.3.

Harmonic analysis of the nominal 6-degree mean angle of attack data results in large values of the first harmonic, sizeable values of the second harmonic, and small values of the third harmonic. The second and third harmonics probably arise from the nonlinearity of the drag curve. Figure 25 presents the mean drag coefficient and the first two harmonics as functions of the frequency parameter. As was the case for $\bar{\alpha} = 0$, the mean value of drag increases rapidly with increasing k. The amplitudes of the first and second harmonics decrease with increasing k.

Data for both mean angles of attack exhibit the rapid increase of $\bar{C}_D$ with increasing frequency of oscillation. For low values of k, one would expect the oscillating drag variation to follow the steady state variation with angle of attack. Mean drag coefficients at these low oscillation frequencies are lower than anticipated. Some of this discrepancy may result from the

drag balance temperature problem discussed previously, but it is not conceivable that all of the discrepancy could be arising from this source. For the steady state condition, the drag is a minimum at $\alpha = 0$ degrees and the area of the model surface experiencing turbulent flow is a minimum. As α increases, the area of turbulent flow increases. With the model oscillating, viscous effects may keep the turbulent area from returning to the minimum condition, thereby keeping the drag from obtaining the minimum value. As k increases, the low drag diverges from the steady state minimum. This would account for an increase in the mean value of drag. It would also account for the more rapid rise in $\bar{C}_D$ for $\bar{\alpha} = 6$ degrees, since the steady state drag increase from $\alpha = 6$ degrees to $\alpha = 12$ degrees is roughly four times as great as the drag rise from 0 to 6 degrees. If this is really the case, then the oscillating component of drag should decrease with increasing k. This is borne out by the decrease in the first harmonic amplitude for the model oscillating about $\alpha = 6$ degrees. However, there is no evidence of a decrease in the amplitude of the second harmonic for the $\alpha = 0$ condition. This may be because the change in amplitude for this condition would be so small that it is masked by the scatter in the data.

In the data presented for $\bar{\alpha} = 0$ degrees, there is no indication of any changes in the drag coefficients due to change in pitch-axis location. For $\bar{\alpha} = 6$ degrees, there are considerable changes with pitch axis, especially in the first harmonic values. The mean value of drag tends to increase as the pitch axis is moved rearward and the oscillatory amplitude (first harmonic) decreases. The large change in the first harmonic may be due to an increased camber effect as the pitch axis is moved aft. The leading edge of the model has increased travel as the pitch axis is moved rearward, causing an increase in induced camber. The effect of the camber is to shift the drag curve so that the minimum drag occurs at a higher angle of attack. As the drag curve is shifted, the oscillation takes place over a flatter region of the curve, thereby reducing the difference between minimum and maximum values.

The second harmonic data presented in Figure 25 for $\bar{\alpha} = 6$ degrees show a decrease in amplitude with increasing k (varying somewhat with pitch-axis location). If the first harmonic (amplitude) is decreasing with k, then a decrease in the second harmonic may result from an accompanying increase in linearity. It should be noted that speaking of amplitudes of the harmonics is not the same as amplitude of oscillating drag, since the drag is composed of the sum of the harmonics.

In spite of the problems associated with obtaining the drag data and the scatter of the results, it is felt that the drag trends are quite pronounced; the consistency obtained from the three models verifies these trends. It is felt that the large mean drag increases reported here would warrant

further investigation. A drag balance of the type used may be feasible if the sensitivity can be increased. It may be possible to use semiconductor strain gages on the balance which give an order of magnitude increase in sensitivity over the foil gages presently employed. If this were possible, then the beams may be thickened, pushing the natural frequency up, and the sensitivity may still be increased by a factor of two or three.

Instantaneous Normal Force and Moment Coefficients

Instantaneous normal force and moment coefficients are presented in Figures 26 and 27 as functions of instantaneous angle of attack for the 50 percent chord model oscillating about a mean angle of attack of 6.22 degrees. Figures 26 and 27 are for low oscillating frequency and high oscillating frequency respectively. These figures, along with Figures 18 through 23, summarize the normal force and moment characteristics for the model oscillating in the linear portion of the angle of attack range. The 50 percent chord axis was chosen for these figures because the greater slope of the pitching moment versus angle of attack curve aids in the pictorial presentation. Data for the other models could have been presented and the conclusions would not be altered. The experimental data in Figures 26 and 27 are the fundamental harmonics obtained from the results of the harmonic analysis. Results of the harmonic analysis indicate that there was very little deviation from pure sinusoidal motion. The average amount of second harmonic present in pitching moment, normal force, and motion was equal to or less than 1 percent of the fundamental amplitude. This justifies the use of the fundamental harmonic for data presentation and accounts for the smooth curves presented. Theoretical values are presented in the figures for comparison with experimental results.

Agreement between theory and experimental results is excellent as far as shape, magnitude, and direction of traverse are concerned; but at the higher frequency, there is a noticeable displacement between the curves. The direction of traverse and the oblateness of the curve are functions of the phase relationship. The direction of traverse changes for the normal force for the low- and high-frequency curves. This agrees with the data of Figure 22 which show the phase angle to be about equal for the two frequencies but of different sign. The decrease in amplitude for the two frequencies as indicated in Figure 22 shows up as a tilting of the curve in Figure 27. The agreement between theory and experiment regarding size, shape, and direction of traverse relates to the oscillatory components. However, the displacement of the curves indicates a discrepancy between the mean values predicted by theory and the results of the tests. The mean values of normal force and moment predicted by theory[3] are:

$$\bar{C}_N = 2\pi\bar{\alpha}\,C(k)^*$$

$$\bar{C}_M = (1/2 + a)\,\pi\bar{\alpha}\,C(k)$$

where a is a constant for a given model
C(k) is Theodorsen's complex circulation function, F(k) + i G(k)

For k = 0, F(k) is equal to 1, G(k) equals zero, and steady state theory results. At k > 0, C(k) is always less than 1, resulting in a decrease of mean values with increasing oscillating frequency. Test results give no evidence of this decrease of mean values. Some of the test results for normal force mean values are presented along with theory in Figure 28.

Instantaneous normal force and pitching moment coefficients are presented in Figures 29 through 31 for the 25, 37, and 50 percent pitch-axis models, respectively, as functions of instantaneous angle of attack. The mean angle for each case is in the proximity of the steady state stall angle of attack. The normal force curves are quite similar for the three models and show the same trends as the pressure model data. That is, normal force stall is delayed as the oscillating frequency is increased until at high frequency, there is essentially no indication of stall. While the curves and the trends are quite similar, there are some differences in the individual shapes. These differences probably arise from the differences in the steady state stall characteristics of the models and the differences between steady state stall angle of attack and oscillating mean angle. In other words, if the same model were oscillated at slightly different mean angles close to the steady state stall angle, the resulting instantaneous curves would have slightly different shapes. However, the general trend with k should remain the same. From the oscillograph records, it was observed that there was even a slight variation in instantaneous forces and moments from cycle to cycle. The data presented in the figures of this report are for a representative cycle.

Instantaneous pitching moments exhibit considerable variation with pitch-axis location. This would be expected due to the large differences in the steady state pitching moment for the different pitch axis. However, there are also differences in the trends with changes in frequency parameter. For the pitch axis at the 25 percent chord location, the pitching moment experiences a sharp negative increase in magnitude to a value of -0. 36 at k = . 103. As k increases, this magnitude is reduced. The pressure model

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* C_N and C_L are used interchangeably, since they are very nearly equal at low angles of attack.

exhibited a similar increase in negative magnitude to -0.33, which is almost an identical magnitude, under slightly different test conditions. The exact frequency at which this increase in magnitude occurs is probably dependent upon the nature of the steady state stall and the mean angle at which the model is oscillating. An increase of reduced magnitude [illegible] o occurs for the 37 percent pitch-axis model at the same k value. [illegible] again, negative peak in C_M diminishes as k increases. There is no indication of this sharp change when the pitch axis is located at the 50 percent chord point. Here the minimum pitching moment is about the same for all values of k. Thus, the sharp change in pitching moment appears to be a function of reduced frequency and pitch-axis location.

COMPARISON OF DATA

Comparison With Theory

Theoretical results based on the thin airfoil incompressible theory of Theodorsen[3] have been presented along with the experimental results where applicable. The agreement between theory and experiment is excellent for normal force coefficients (both phase and amplitude). Pitching moment amplitude agrees well with theory, but there are some discrepancies in phase angles. The phase angle for the 25 percent pitch-axis force model tends to approach zero degrees as k goes to zero rather than the value of 270 degrees predicted theoretically. This trend has also been noted by Wyss and Herrera[4] for different airfoil profiles oscillating about the quarter chord. There is no evidence of this trend in the pressure data results, but then it was not possible to determine the phase angles at k values below 0.1 with any degree of accuracy from the test results. Theoretically, the moment amplitude goes to zero as k approaches zero (steady state theory). However, the experimental results indicate finite values of C_M for α other than zero. Therefore, one would expect an oscillatory amplitude greater than zero at very low k values, and since the moment is finite, as the α range is traversed very slowly, the phase angle should be essentially zero degrees. Phase angle data for the 37 percent pitch-axis model diverge from the theoretical values at higher k values. No reasonable explanation for this divergence is now available, since the data for both the 25 percent axis model and the 50 percent axis model show good agreement with theory at the higher values of k.

Comparison of Pressure Model and Force Model Results

Oscillatory normal force and pitching moment data obtained by pressure measurements and those obtained by direct force measurements may be compared by examining Figures 7, 8, 18, and 19. The data presented in these figures are for the pitch axis located at the quarter chord and for

oscillations about small mean angles of attack. Theoretical results are presented in all figures so that the data may be compared by noting the agreement with theory. The results of the two models show excellent agreement except in the case of pitching moment phase angle, as noted previously.

Instantaneous normal force and pitching moments are presented for the two models in Figures 9, 10, and 29. The instantaneous curves for the two models have similar shape and indicate the same trends with increasing oscillating frequency. The differences in shape of the individual curves obtained for a given oscillating frequency are to a large measure attributed to the differences in the stall characteristics of the two models and the relationship of the mean angle of attack to the steady state stall angle of attack. The minimum pitching moment values for the pressure model and the force model of -0.33 and -0.36, respectively, compare exceedingly well. Also, from Figures 9 and 29, for which the mean angle is close to the stall angle, the maximum C_N values obtained for both models of approximately 1.8 agree quite well.

Comparison With Previous Results

Some previous investigations are reported in Appendix I for airfoils oscillating at low mean angles of attack. Once again the data are compared with theory and can be compared with the results of this investigation using theoretical values as a guide.

Instantaneous normal force and pitching moment coefficients for airfoils oscillating in the stall region are presented by Halfman[5], Carta[6], and Liiva, Davenport, Gray and Walton[7]. Halfman presents data for three 12-percent-thickness airfoils which he refers to as sharp, blunt, and intermediate. The intermediate airfoil is very similar to the NACA 0012 airfoil. Carta tested a 0012 airfoil. Liiva et al tested a Vertol 23010-1.58 airfoil and a 0012 airfoil.

Data presented by Halfman are for a pitch axis at 37 percent chord. Only instantaneous pitching moments are presented, and only a portion of this is for the intermediate airfoil. The data presented for comparable conditions show essentially the same type loops and indicate the large drop in pitching moment as reported herein. The two investigations were conducted at the same value of Reynolds number. Liiva et al present both instantaneous normal force and pitching moment coefficients for an NACA 0012 airfoil oscillating about the quarter chord at a Mach number of 0.4. With the exception of Mach number, oscillating conditions are nearly the same as those reported herein for the 25 percent pitch-axis models. The higher Mach number changes the steady state data somewhat, but the shape of the C_N versus angle-of-attack curve at the stall point is very similar to that of

the force model of this report. The curves show good agreement in shape, magnitude, and trends. Data of this report are for a mean angle closer to the stall angle than that reported by Liiva. Therefore, the model approaches the unstalled condition at a lower value of frequency parameter, causing the curves of this report to agree with those at a somewhat higher value of k in Liiva's report. The values of C_N maximum agree very well (1.7 as compared to 1.8 of this report). The pitching moment drop shows excellent agreement in magnitude (-0.33 as compared to -0.36 of this report).

Halfman[8] presents some drag data for an NACA 0012 airfoil oscillating in pitch about the 37 percent chord at a mean angle of zero degrees. He presents an average drag-amplitude coefficient as a function of k. This drag-amplitude coefficient increases with increasing k. This trend is contradictory to the results of this investigation, which indicate that the mean value increases with increasing k but the oscillatory magnitude remains essentially constant ($\bar{\alpha}$ = 0 degrees) or decreases with increasing k ($\bar{\alpha}$ = 6 degrees). There are no other oscillatory drag data available to support either of these investigations.

CONCLUSIONS

The literature survey revealed considerable low-speed experimental data on oscillating two-dimensional airfoils. Very little of this data can be directly correlated due to the number of parameters involved (oscillating frequency, oscillating amplitude, mean angle of attack, test Reynolds number, airfoil profile and pitch-axis location) and the choice of data recorded by the investigators. In cases where direct correlation is possible, scatter of the data restricts the possibility of any definite conclusions.

The agreement between experimental data of this investigation, obtained from the pressure measurements and the direct force measurements, and the theoretical data at low mean angles of attack indicates that both methods can produce satisfactory results over the frequency range tested. However, it is felt that the present force balance was operating very near its useful limit at the higher oscillating frequencies. Both methods have their advantages and disadvantages. The advantages of each are as follows:

Pressure measurements:

1. Results are not affected by inertia loads.

2. Model supports can be rigid enough that natural frequencies present no problems.

3. Instantaneous pressure distributions may be obtained.

Force measurements:

1. Requires less instrumentation.

2. Less data processing.

3. Possible to obtain drag information. (Oscillating drag trends were obtained in this investigation,but actual drag magnitudes are questionable due to lack of sensitivity and low natural frequency of the drag balance.)

The disadvantages are:

Pressure measurements:

1. Drag data are not available.

2. Requires considerable instrumentation for a reasonable

number of pressure orifices.

3. Requires considerable data processing.

4. Difficult to install sufficient number of pressure transducers in model.

Force model:

1. Inertia loads must be transmitted through the force balance. This imposes problems for balance design.

2. Flexibility required for balance sensitivity results in low natural frequencies.

3. Inertia loads must be eliminated from measurements in some way.

The fact that the pressure data, which were measured along the centerline of the model where the gaps between the model and the tunnel walls had minimal effect upon the results, agree well with the force data indicates that the small gaps employed during the test had little influence upon the data.

From this investigation, it may be concluded that:

1. For values of instantaneous angle of attack not exceeding the steady state stall value, theoretical predictions show good agreement with test results.

2. When oscillating at high frequency about mean angles above the steady state stall angle, values of C_N much greater than the steady state maximum value may be obtained. A value of 2.29 was obtained during this investigation. This is approximately 80 percent greater than the steady state value. It may be possible to achieve considerably higher values with appropriate values of $\bar{\alpha}$, and k.

3. For the models with the pitch axis at the quarter chord, sharp decreases in pitching moment were experienced at some frequencies when the instantaneous angle of attack exceeded the steady state stall values. The minimum value noted during this investigation was -0.36. The decreases in pitching moment were less severe as the pitch axis was moved toward the midchord.

4. Mean drag values increase rapidly with increasing oscillating frequency.

5. Drag results of this investigation indicate a need for better drag studies.

RECOMMENDATIONS

It is recommended that the possibility of increasing the sensitivity of the drag balances, by use of semiconductor strain gages, and increasing the natural frequency of the balance be investigated to obtain more accurate oscillating drag data.

The unusual pressure distributions noted on the lower surface leading edge of the model under some oscillating conditions indicate a possible vortex formation. It would be desirable to do some flow visualization studies to determine the nature of the flow in this region.

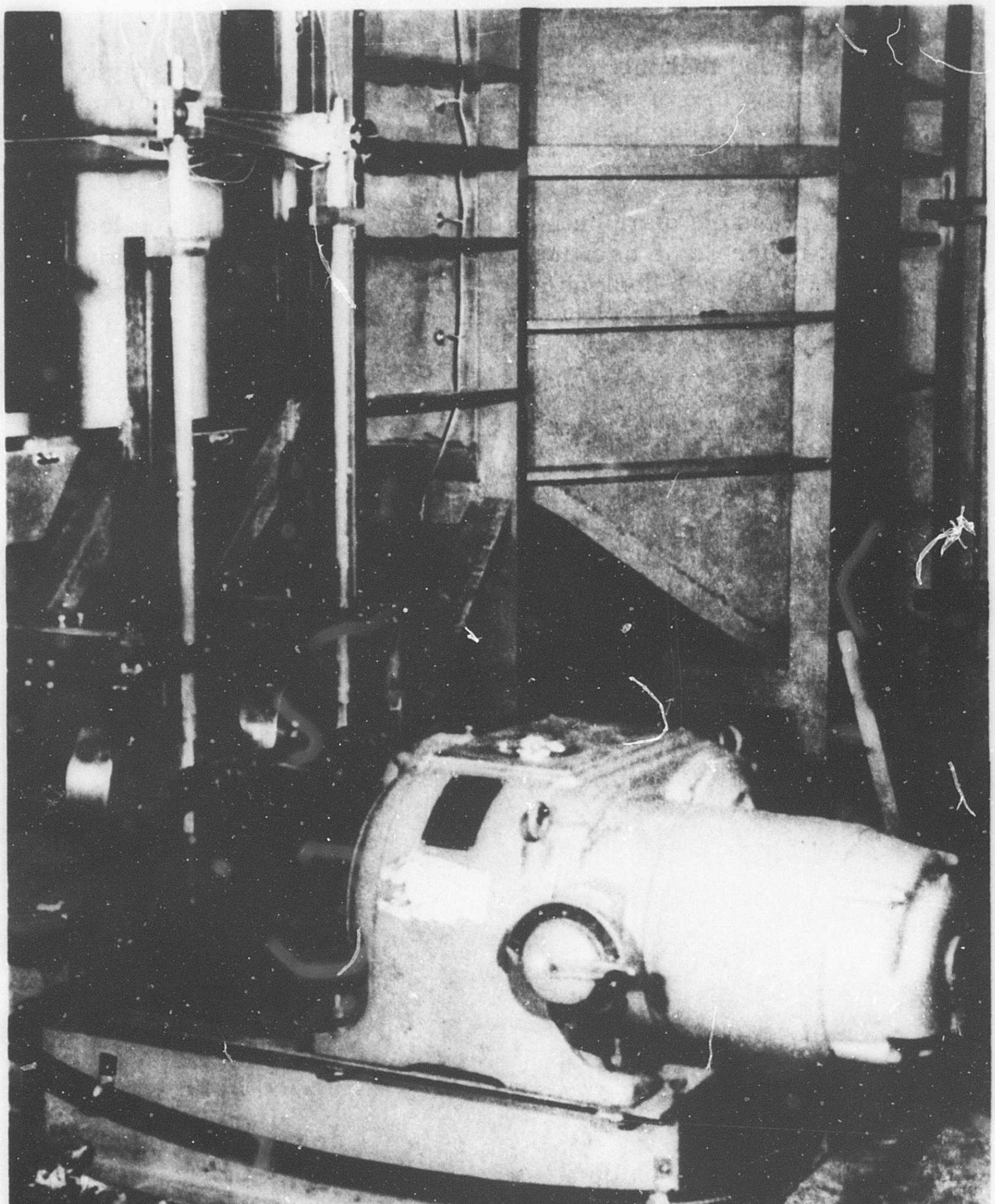


FIGURE 1. Oscillating Drive Mechanism Mounted Under the Test Section of the 1.5-Foot by 3.875-Foot Wind Tunnel.

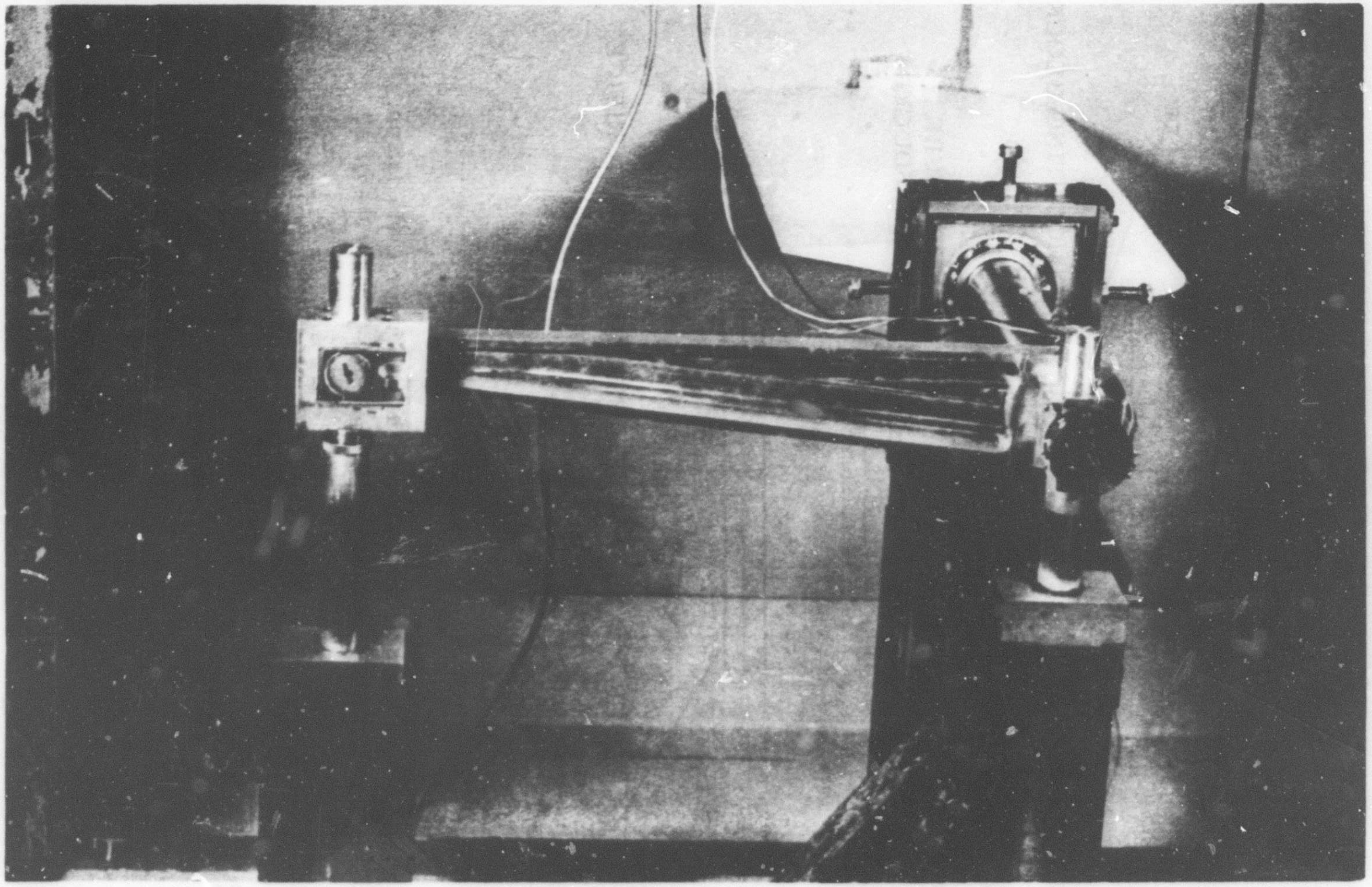


FIGURE 2. View With Tunnel Wall Removed of Force Model (Axis at 50% Chord) Installed in Test Section.

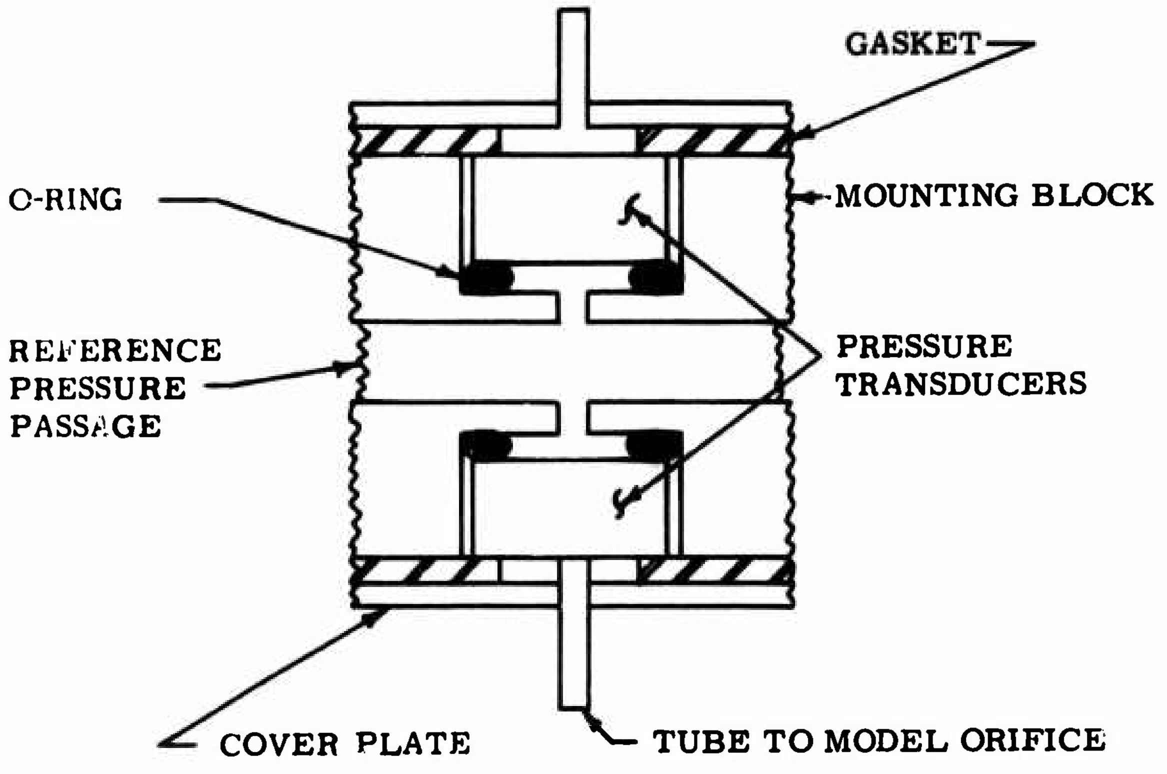


FIGURE 3. Details of Pressure Transducer Installation.

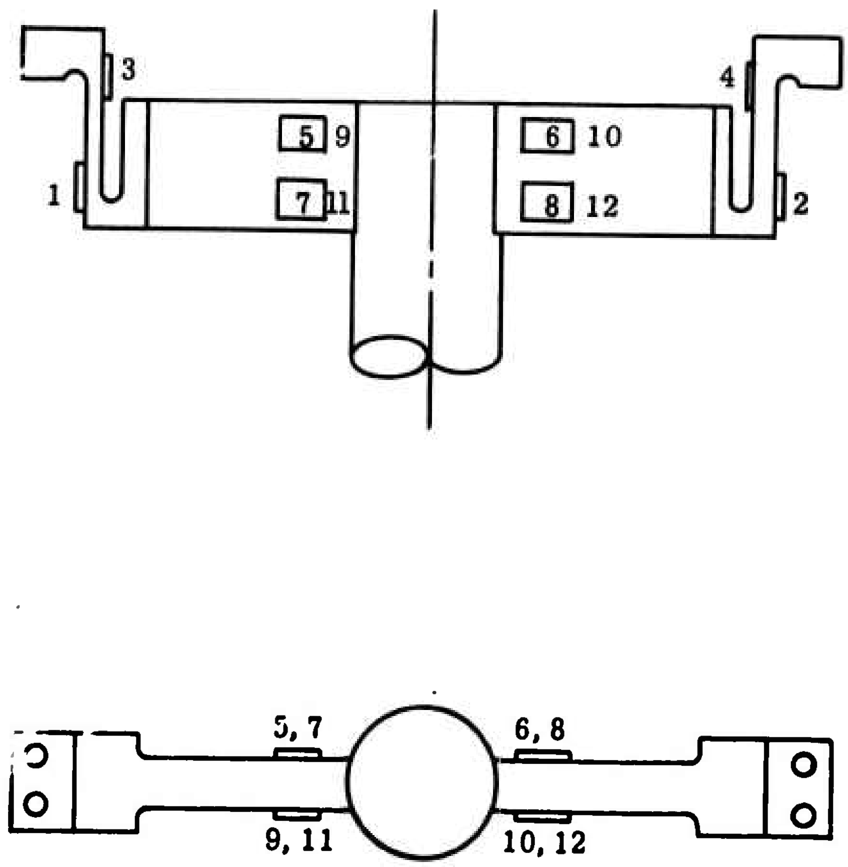


FIGURE 4. Strain Gage Force Balance, Gage Locations.

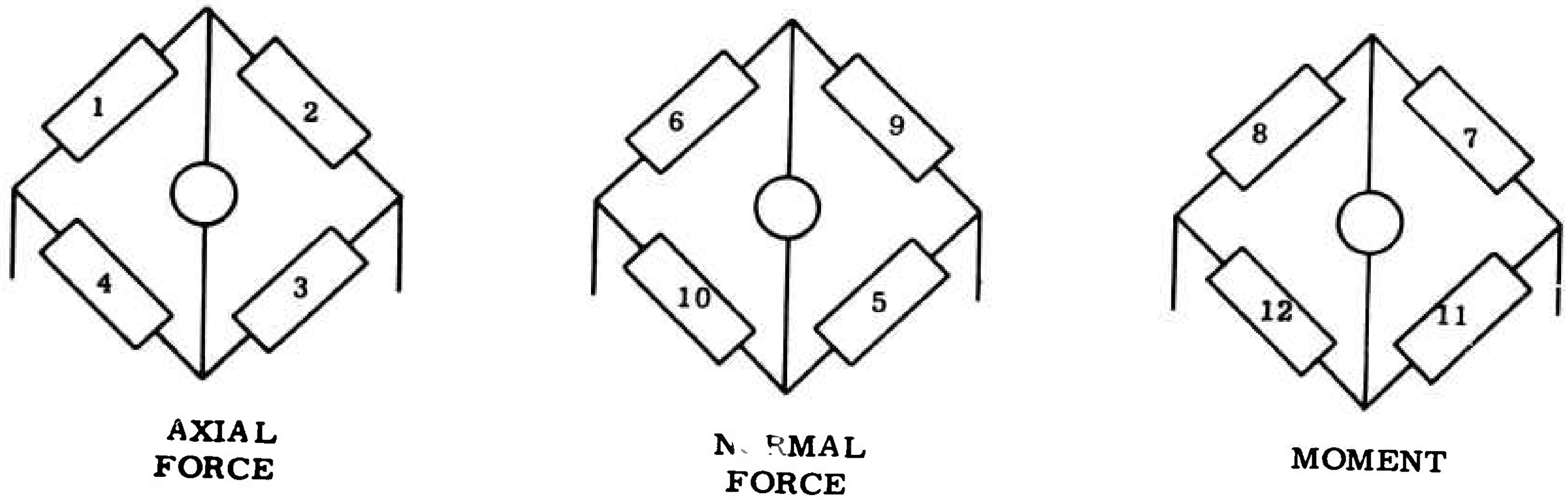


FIGURE 5. Strain Gage Electrical Connections.

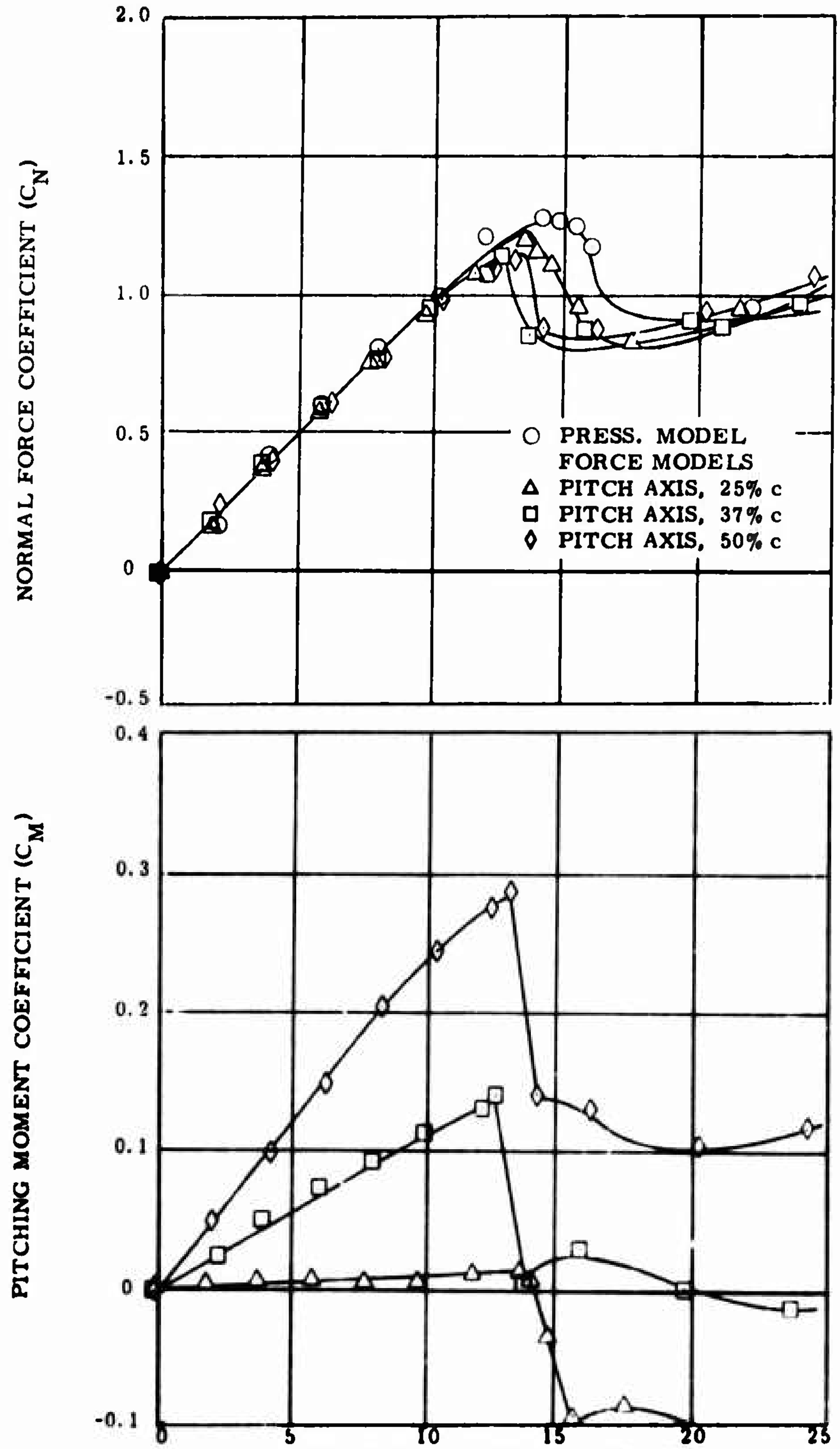


FIGURE 6. Static C_N and C_M Characteristics.

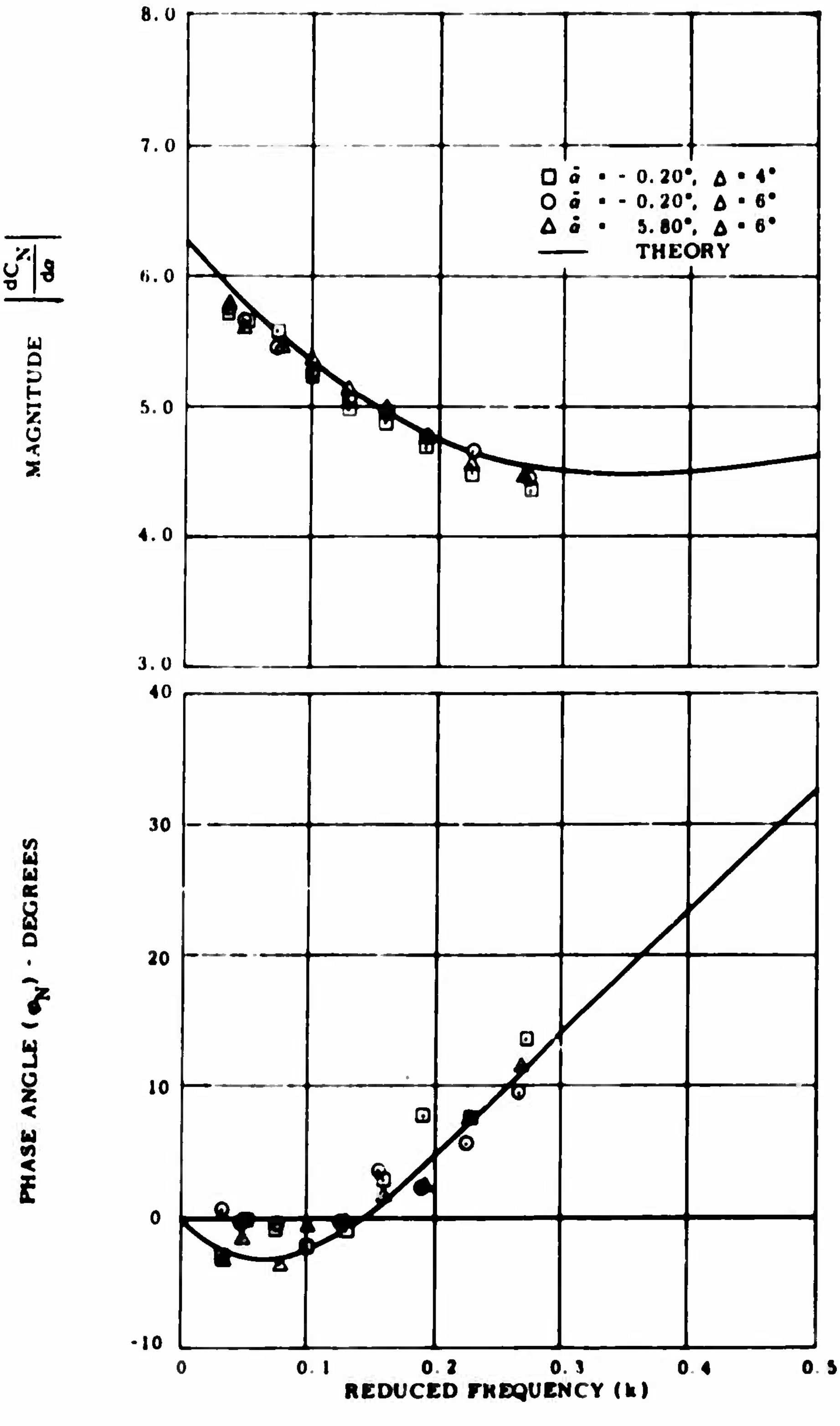


FIGURE 7. Variation of Normal Force Coefficient With Reduced Frequency for Pressure Model Oscillating in Pitch, Pitch Axis at 25% Chord.

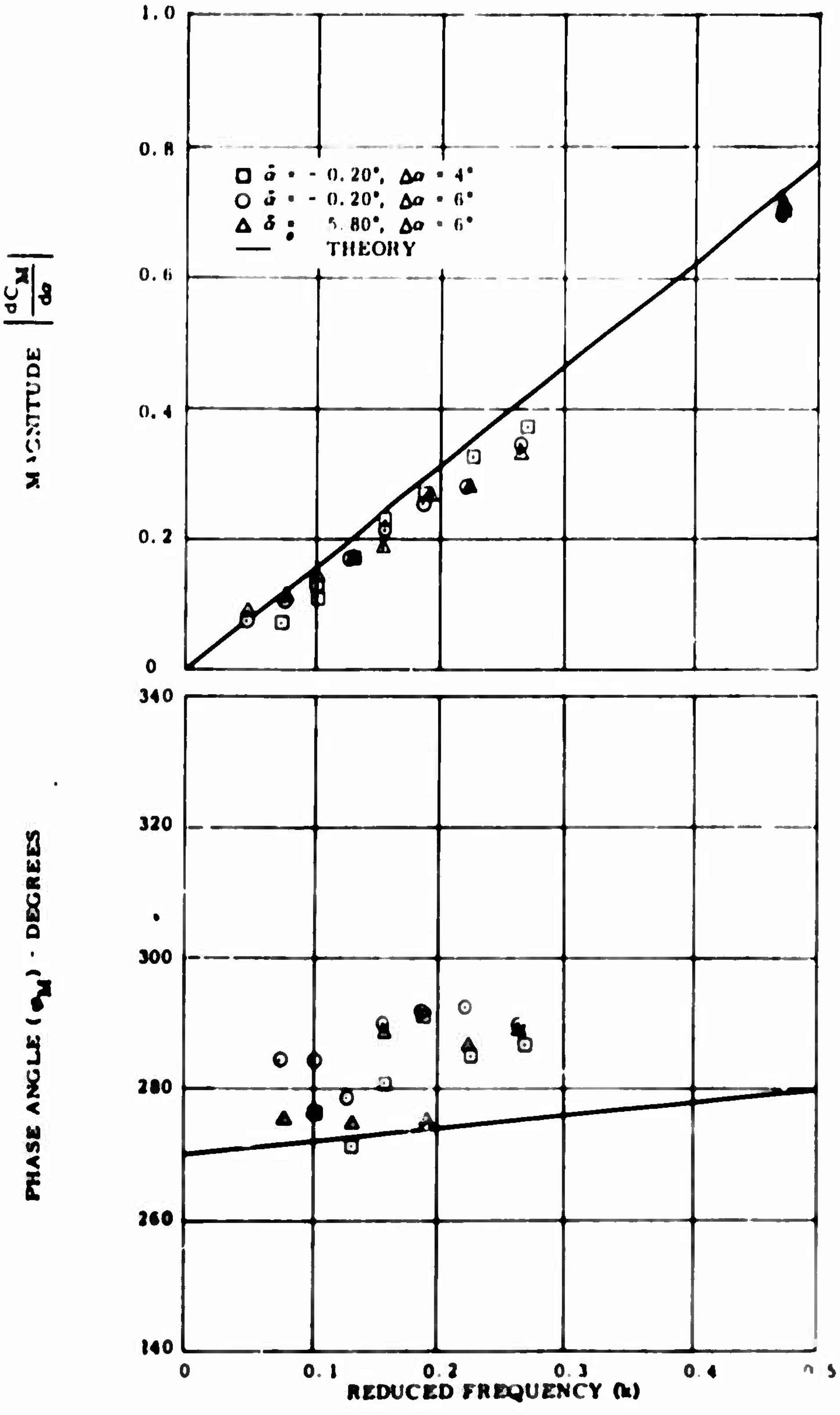


FIGURE 8. Variation of Pitching Moment Coefficient With Reduced Frequency for Pressure Model Oscillating in Pitch, Pitch Axis at 25% Chord.

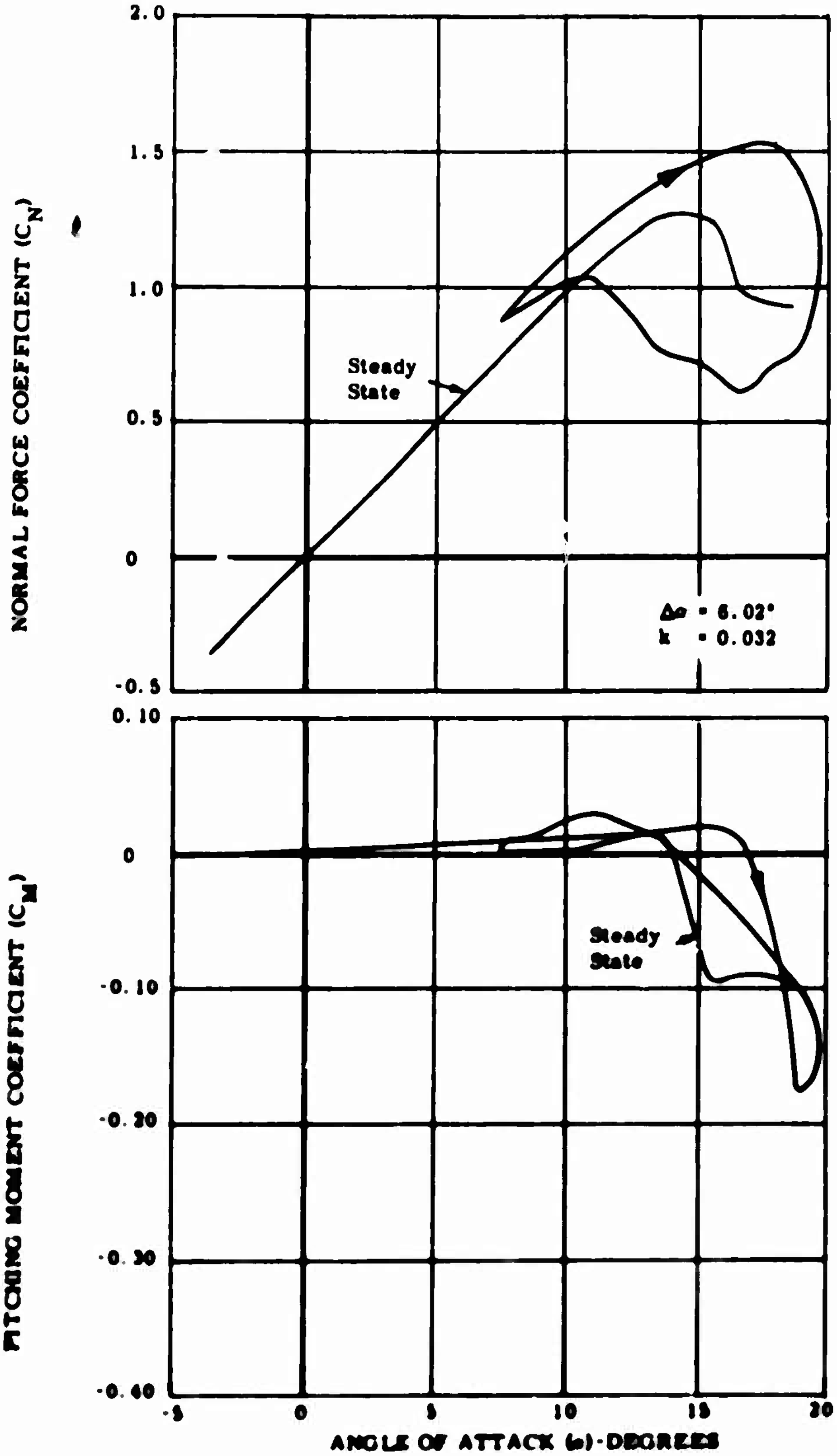


FIGURE 9. Effect of Frequency on Dynamic C_N and C_M, $\bar{\alpha}$ = 13.80°.

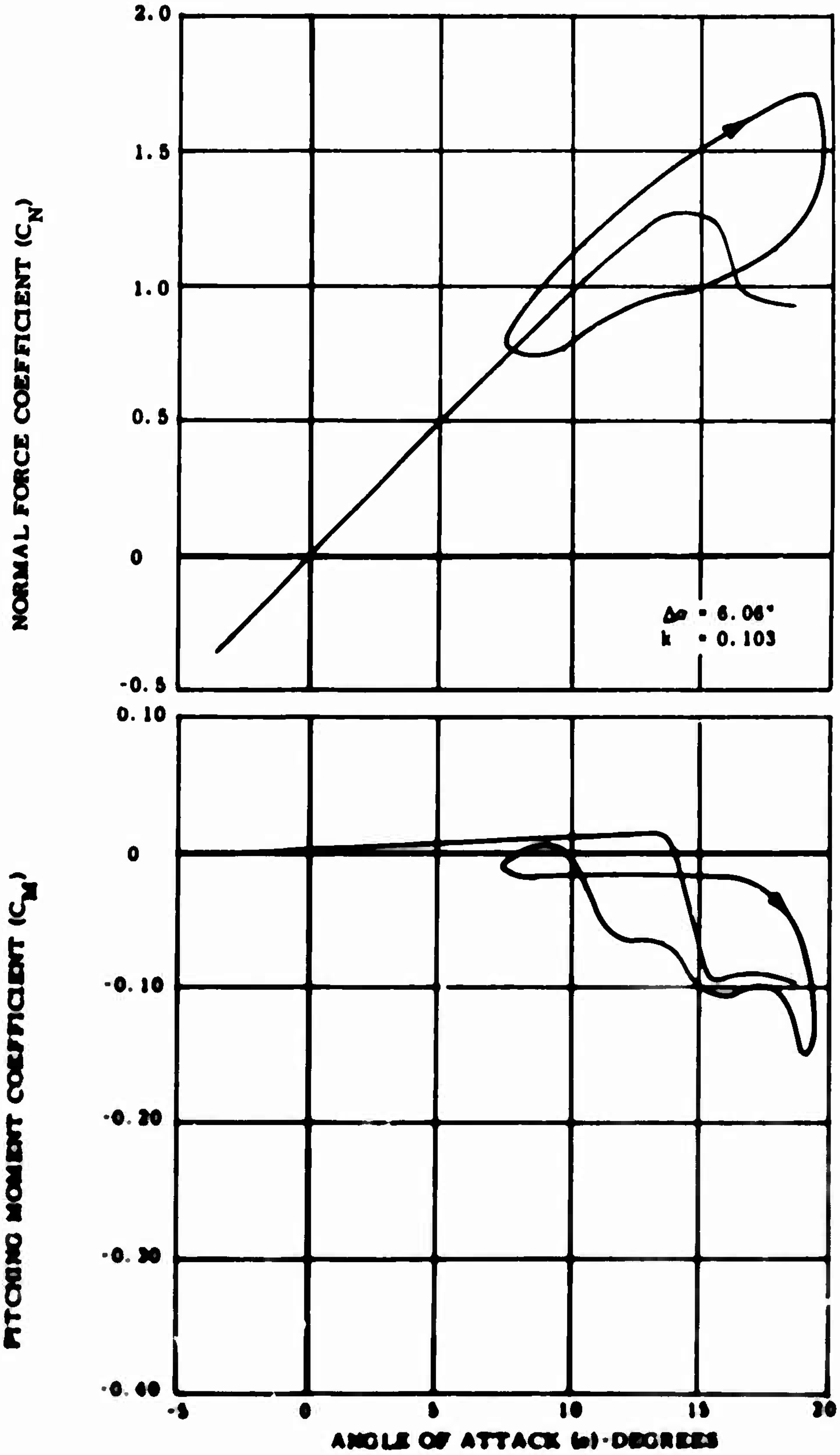


FIGURE 9. Continued.

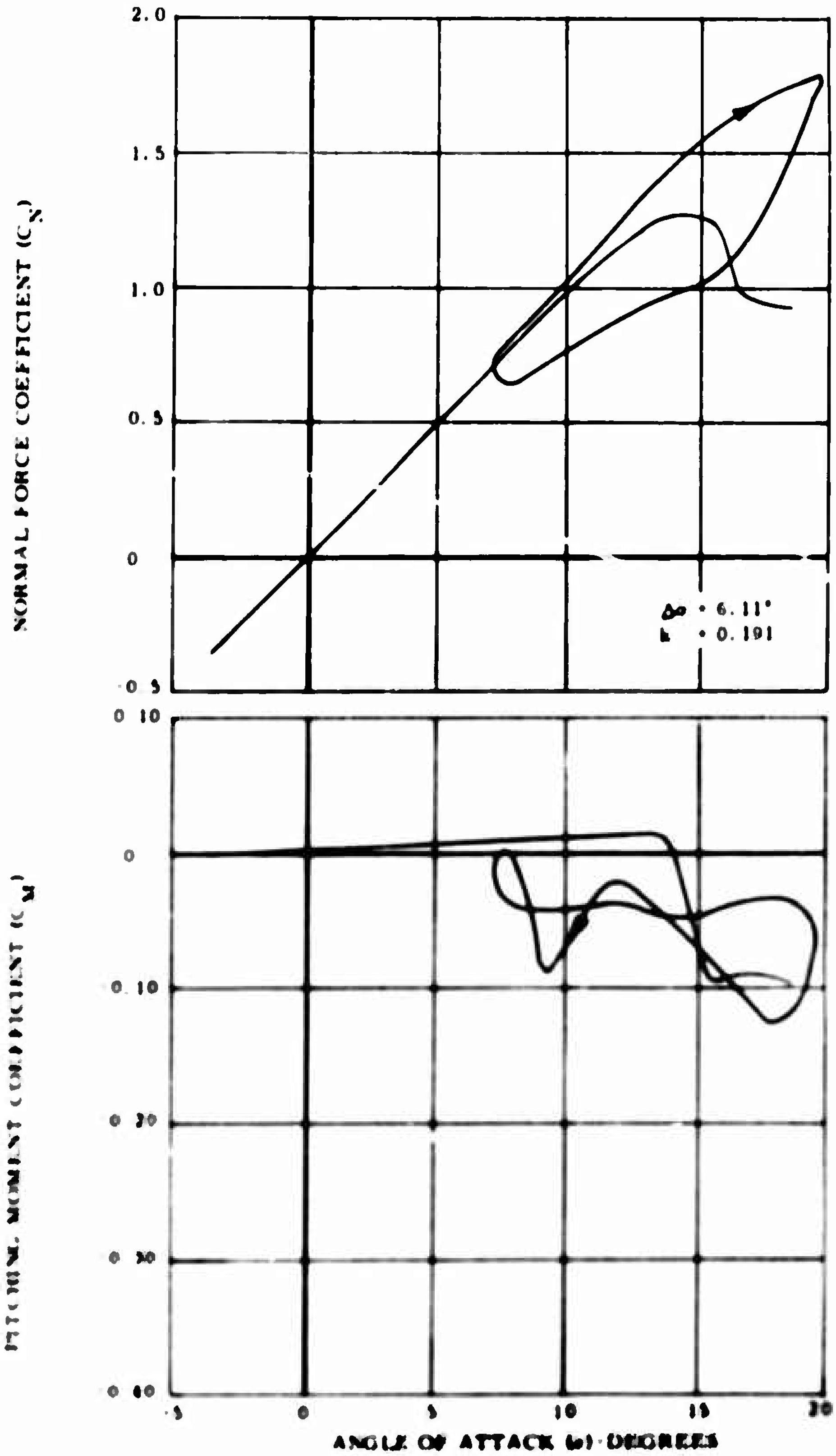


FIGURE 9. Continued.

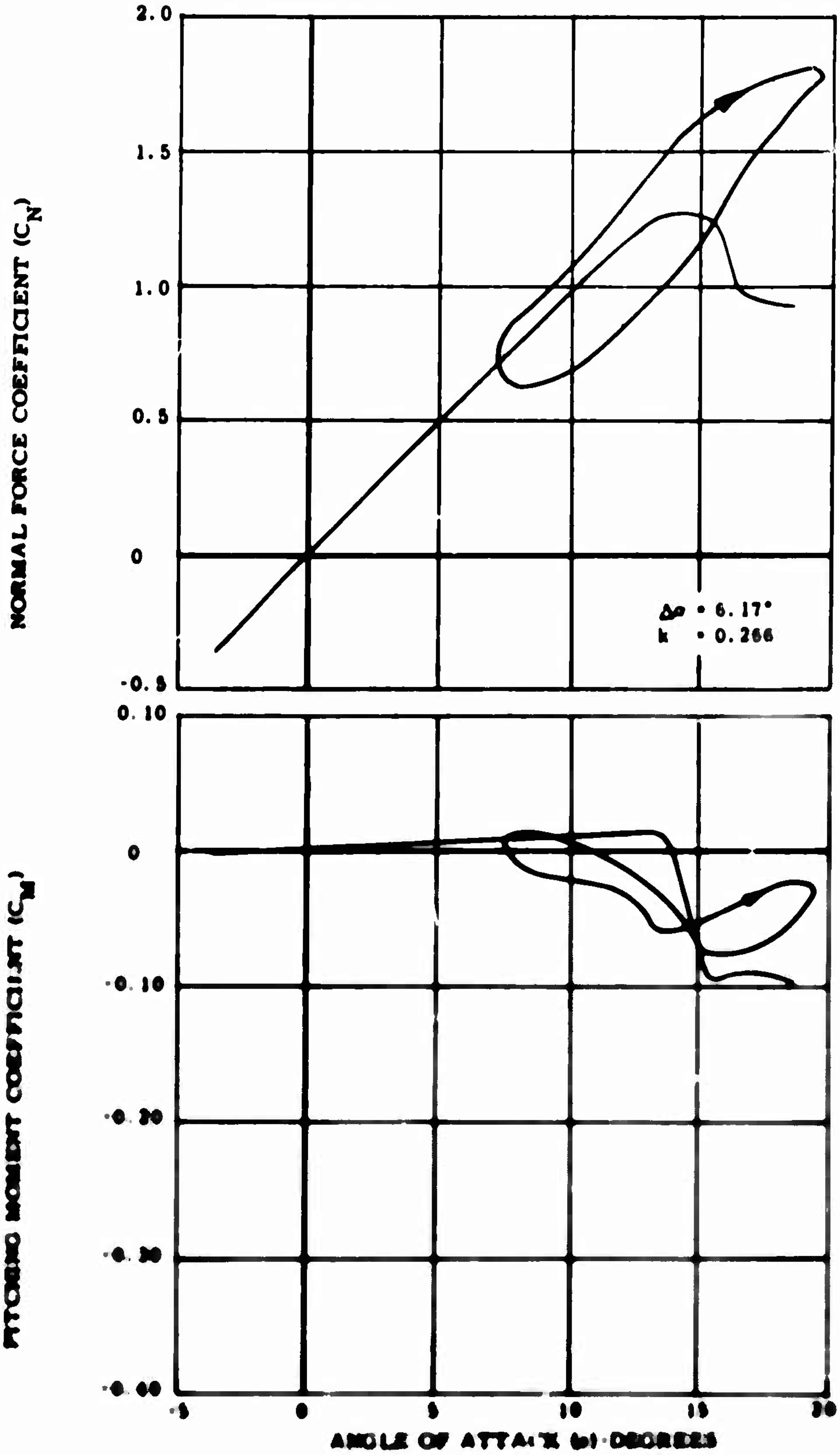


FIGURE 9. Continued.

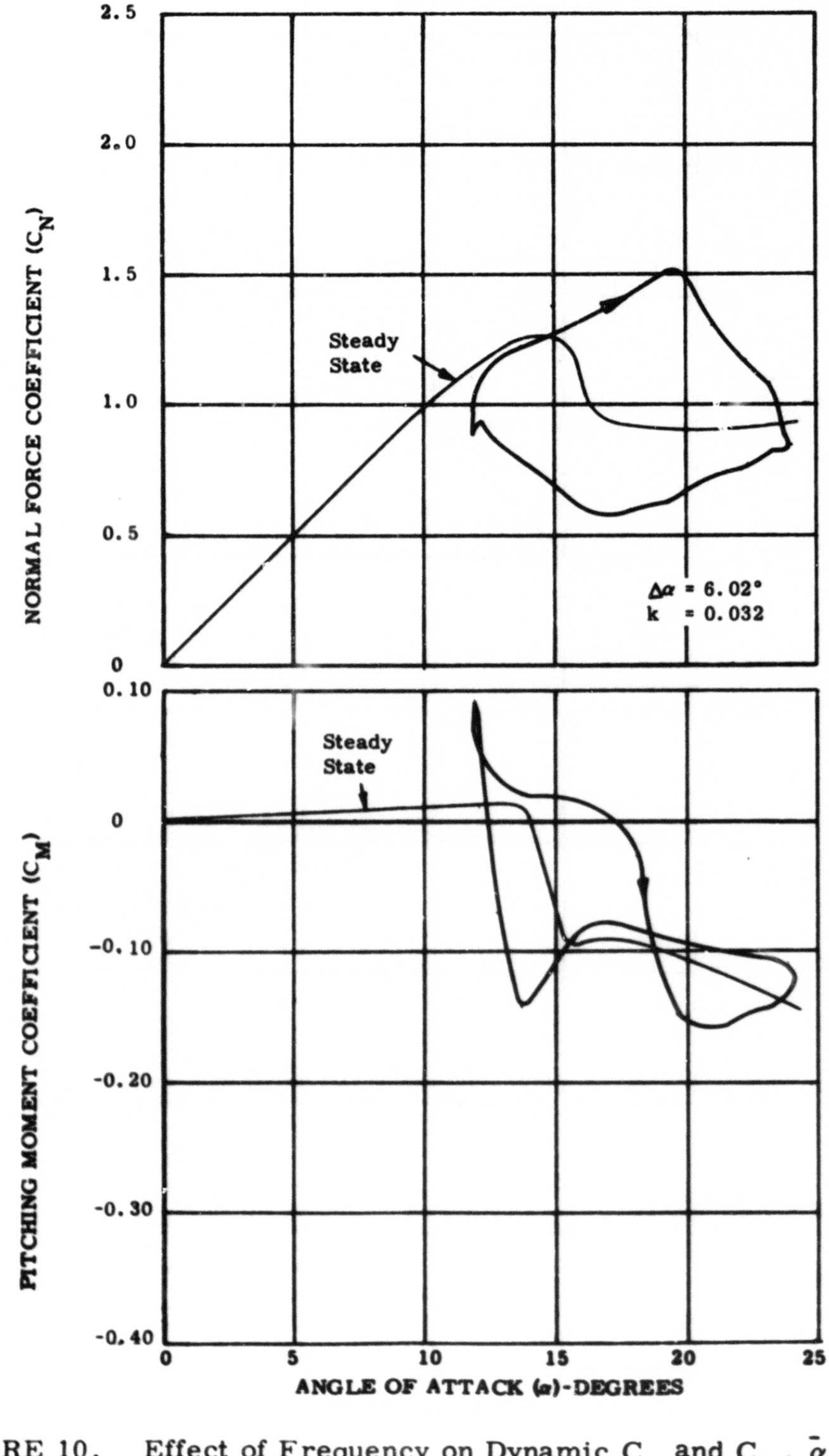


FIGURE 10. Effect of Frequency on Dynamic C_N and C_M, $\bar{\alpha}$ = 18°

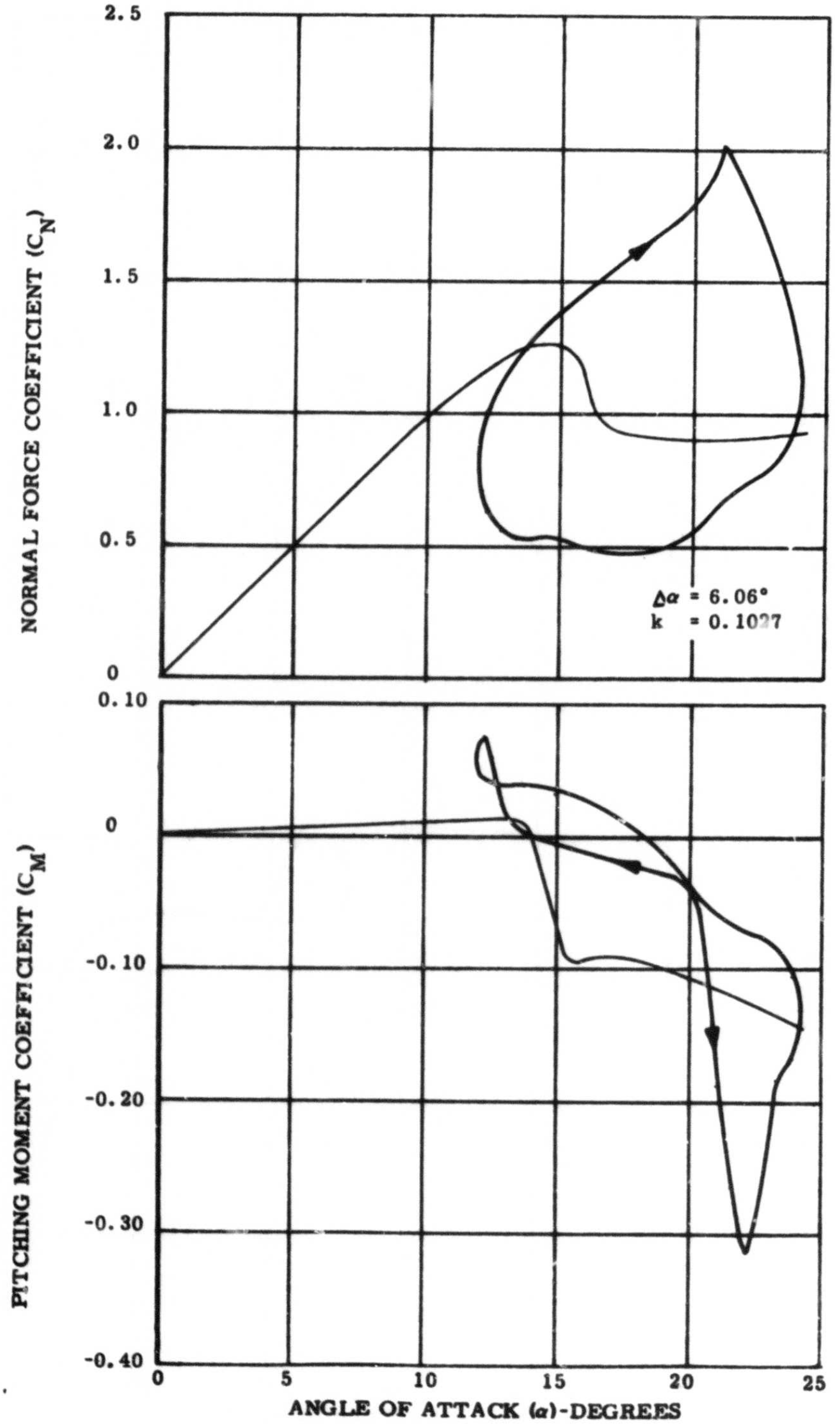


FIGURE 10. Continued.

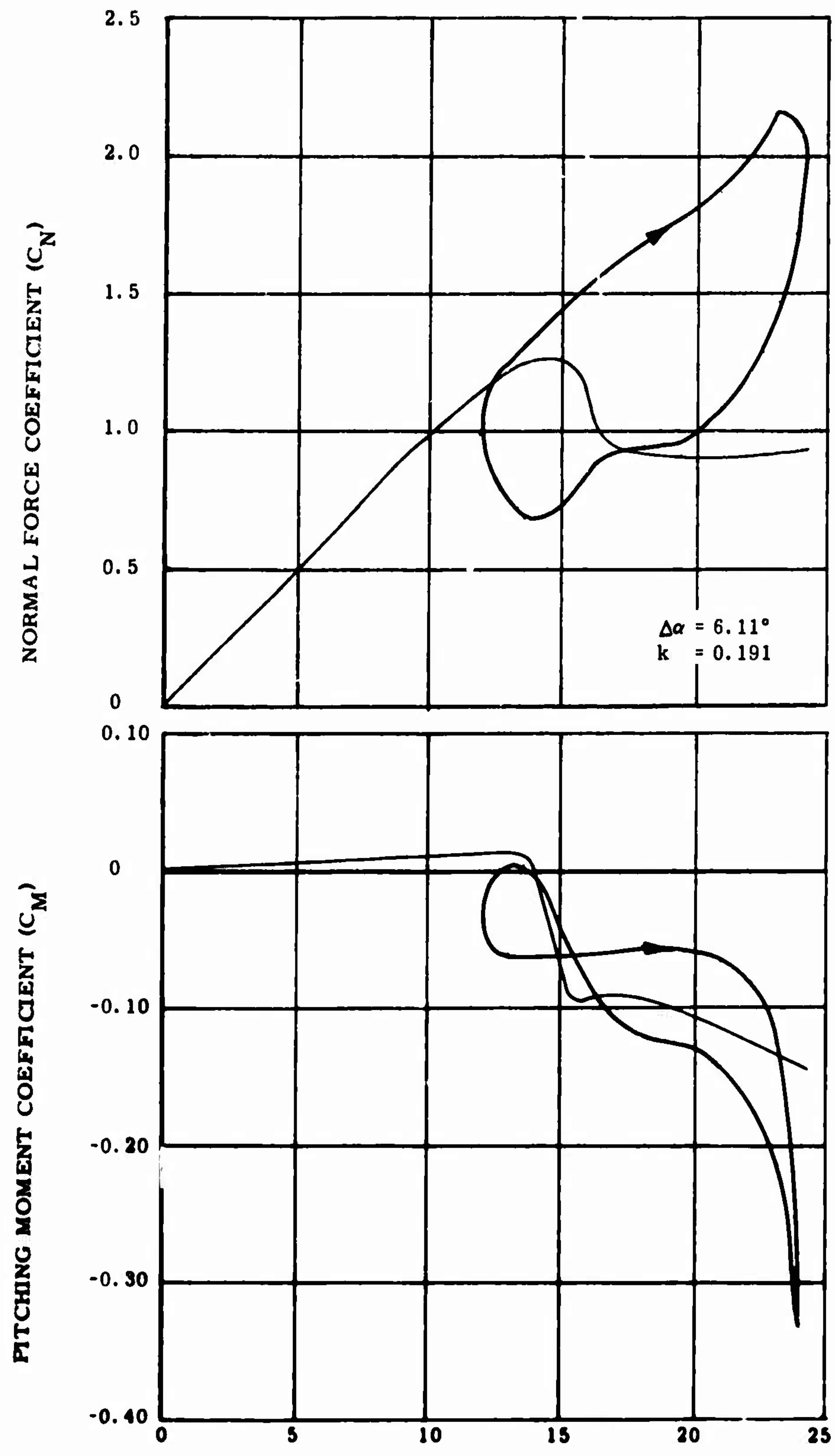


FIGURE 10. Continued.

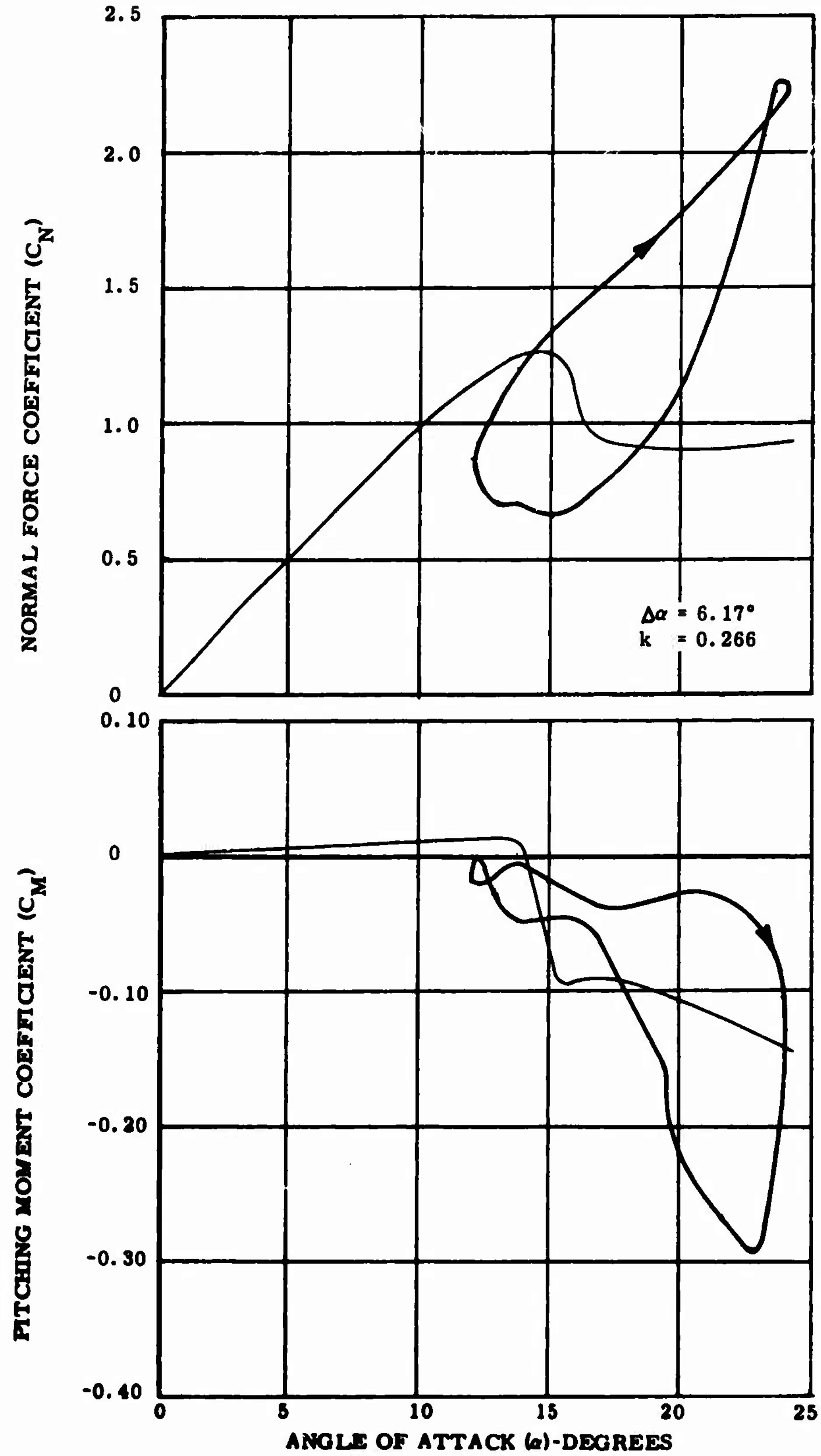


FIGURE 10. Continued.

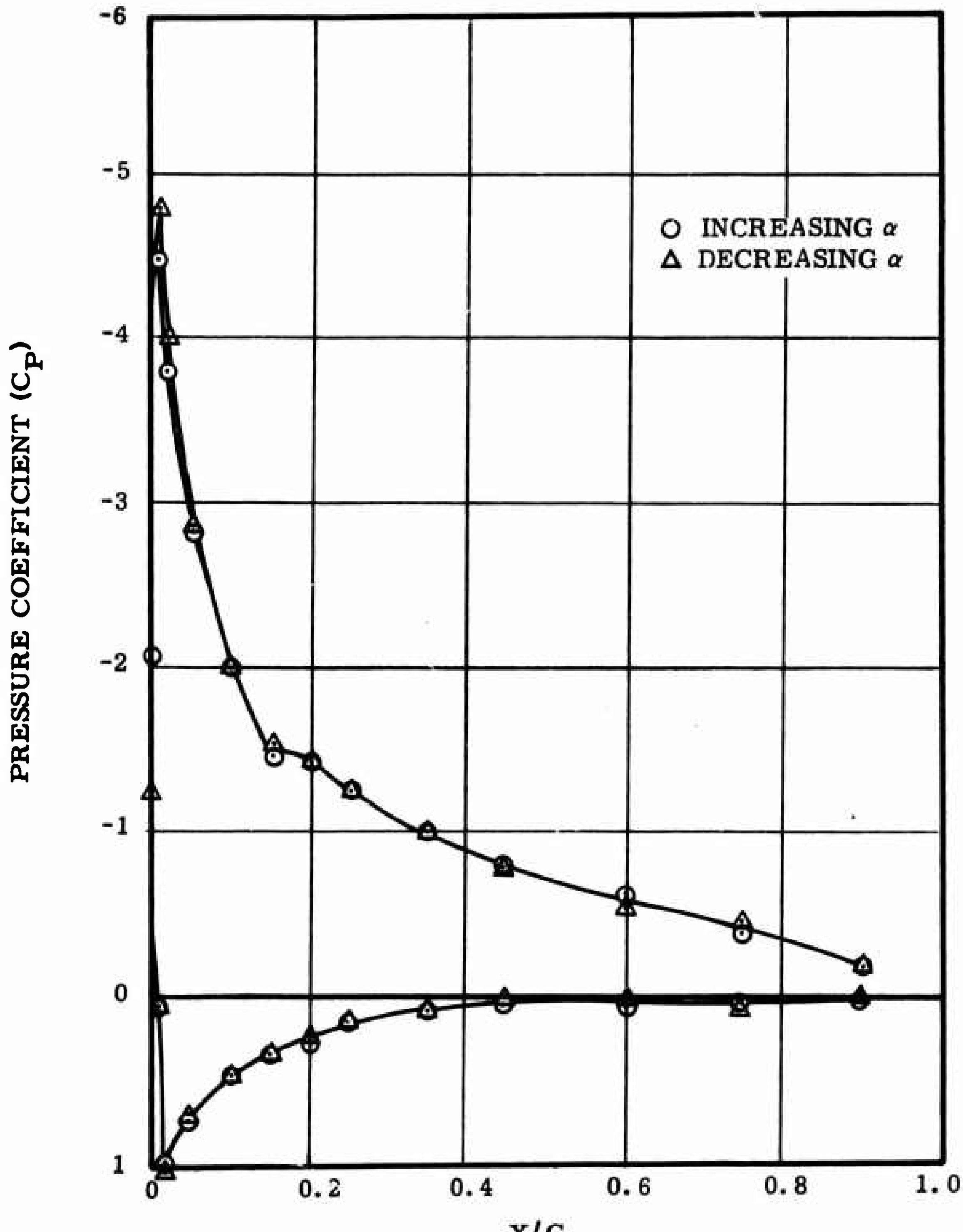


FIGURE 11. Instantaneous Pressure Distributions, α = 10.05°, $\bar{\alpha}$ = 5.80°, $\Delta\alpha$ = 6.0°, k = .032.

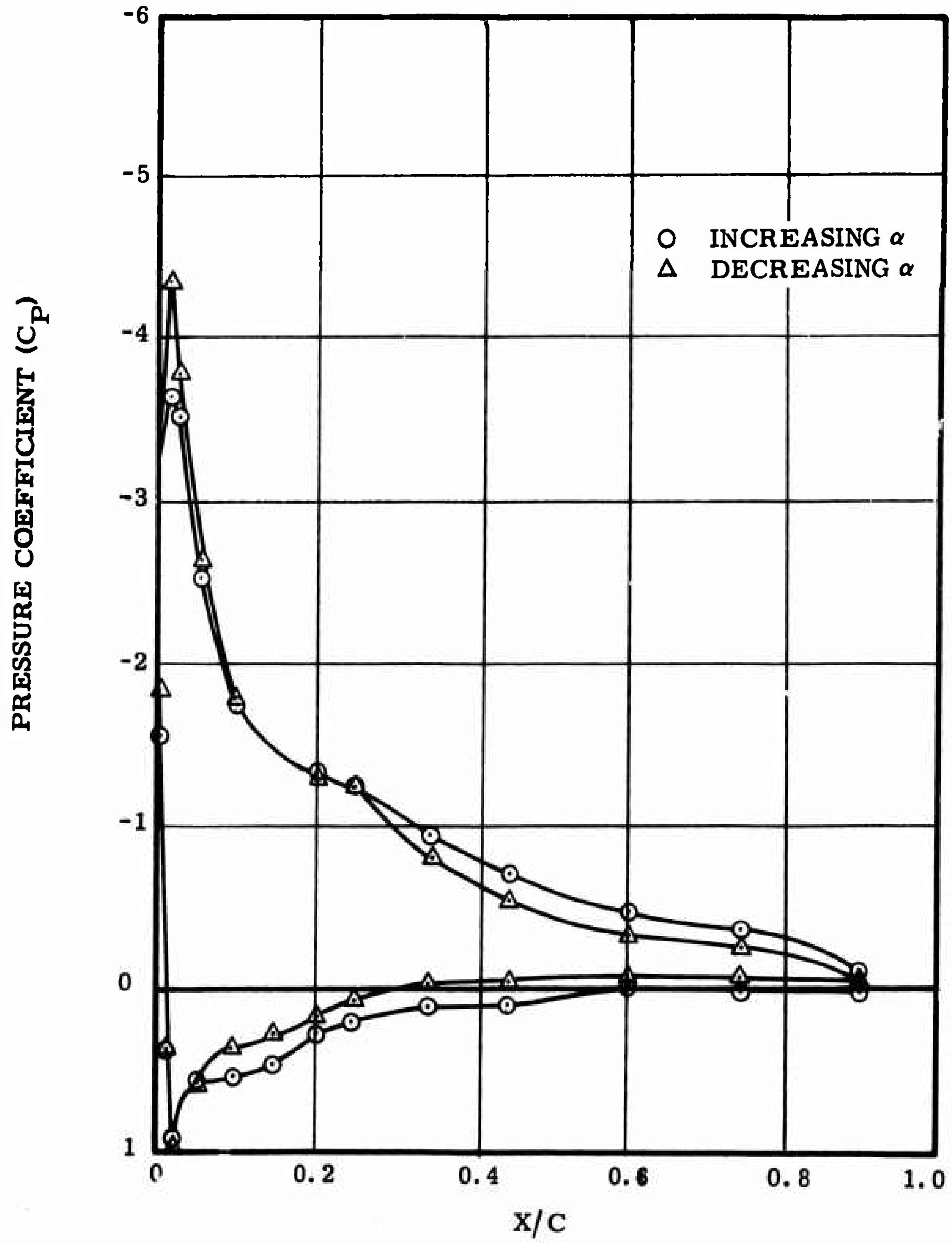


FIGURE 12. Instantaneous Pressure Distributions, α = 10.16°, $\bar{\alpha}$ = 5.80°, $\Delta\alpha$ = 6.17°, k = .268.

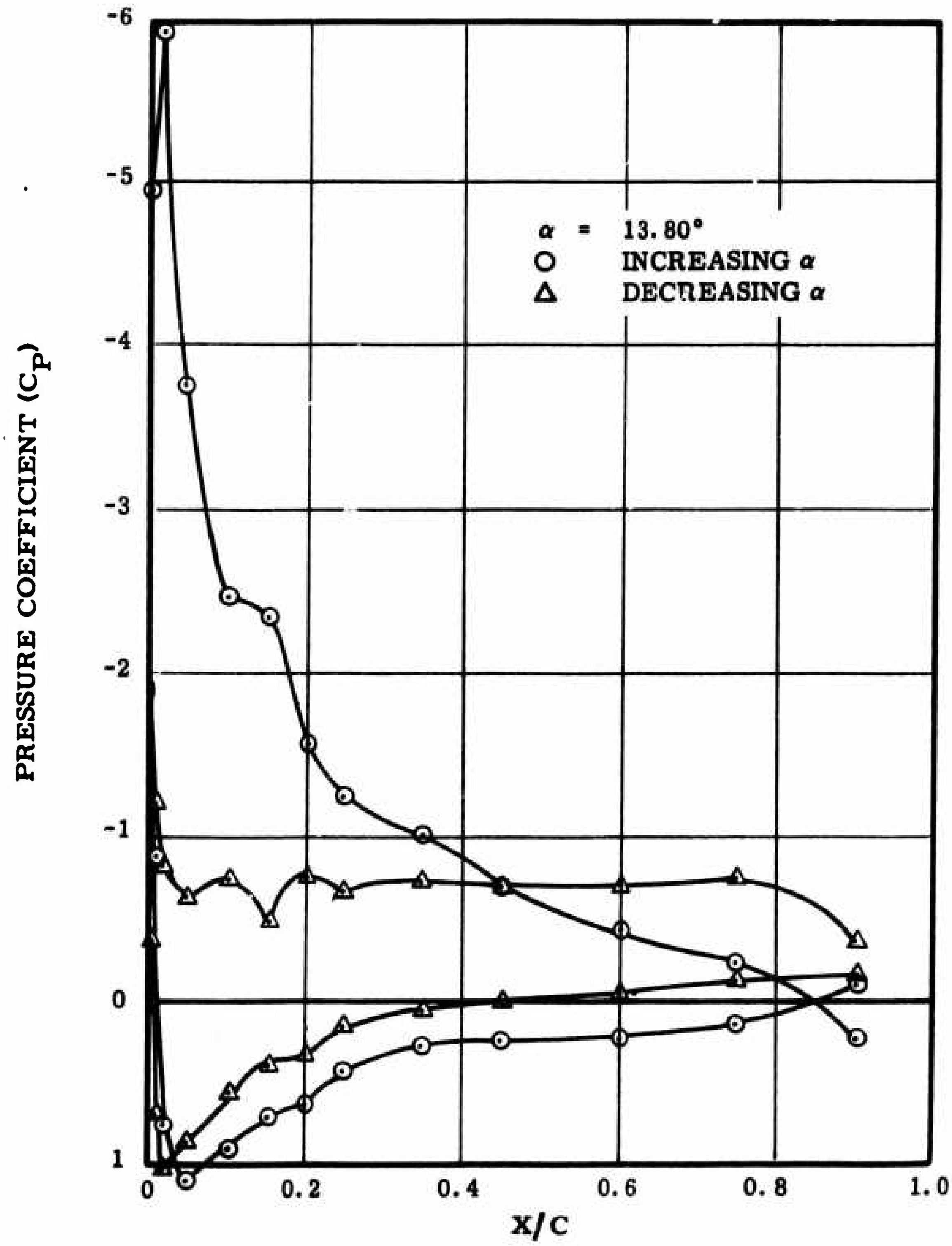
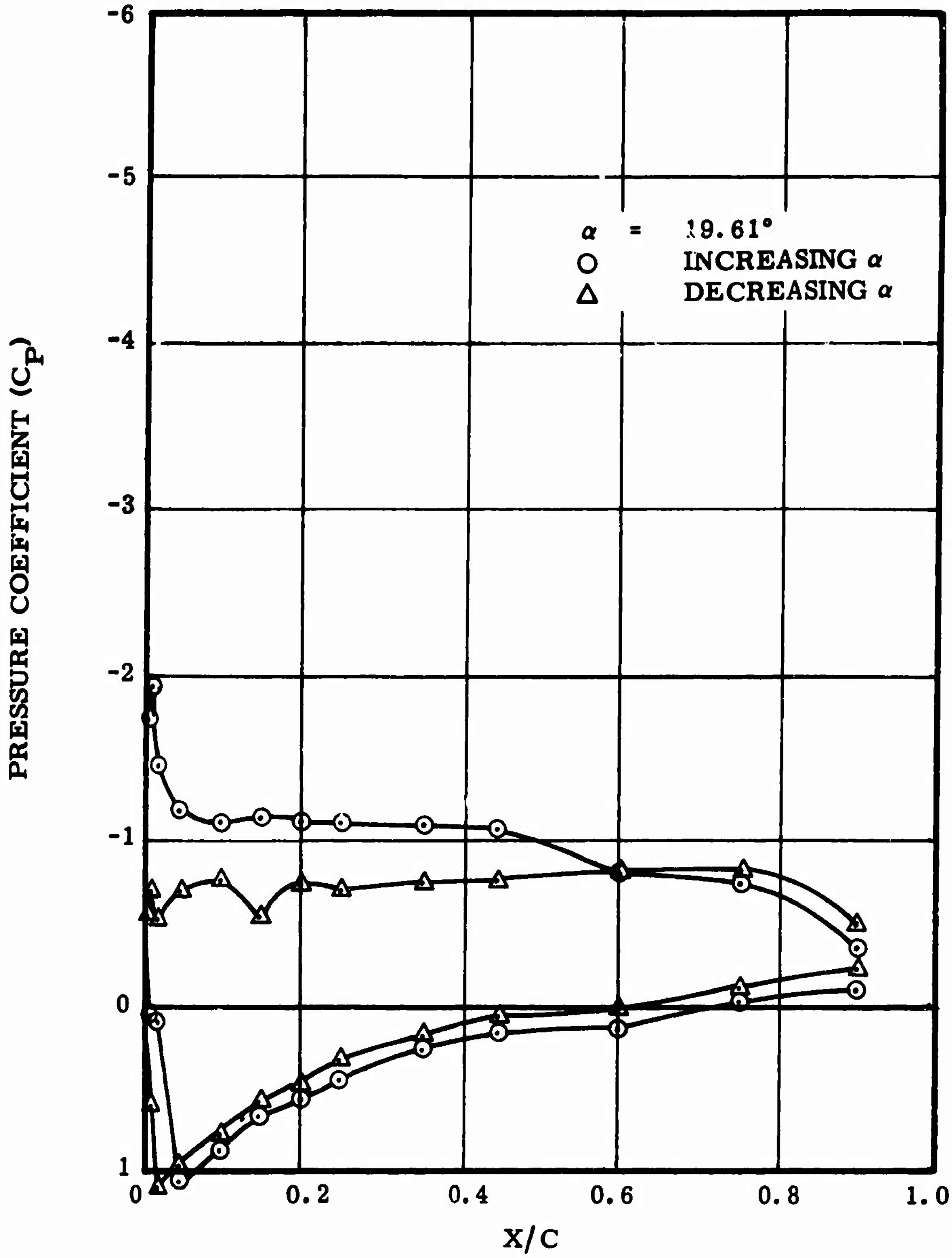


FIGURE 13. Instantaneous Pressure Distributions, $\bar{\alpha}$ = 13.80°, $\Delta\alpha$ = 6.02°, k = .032.



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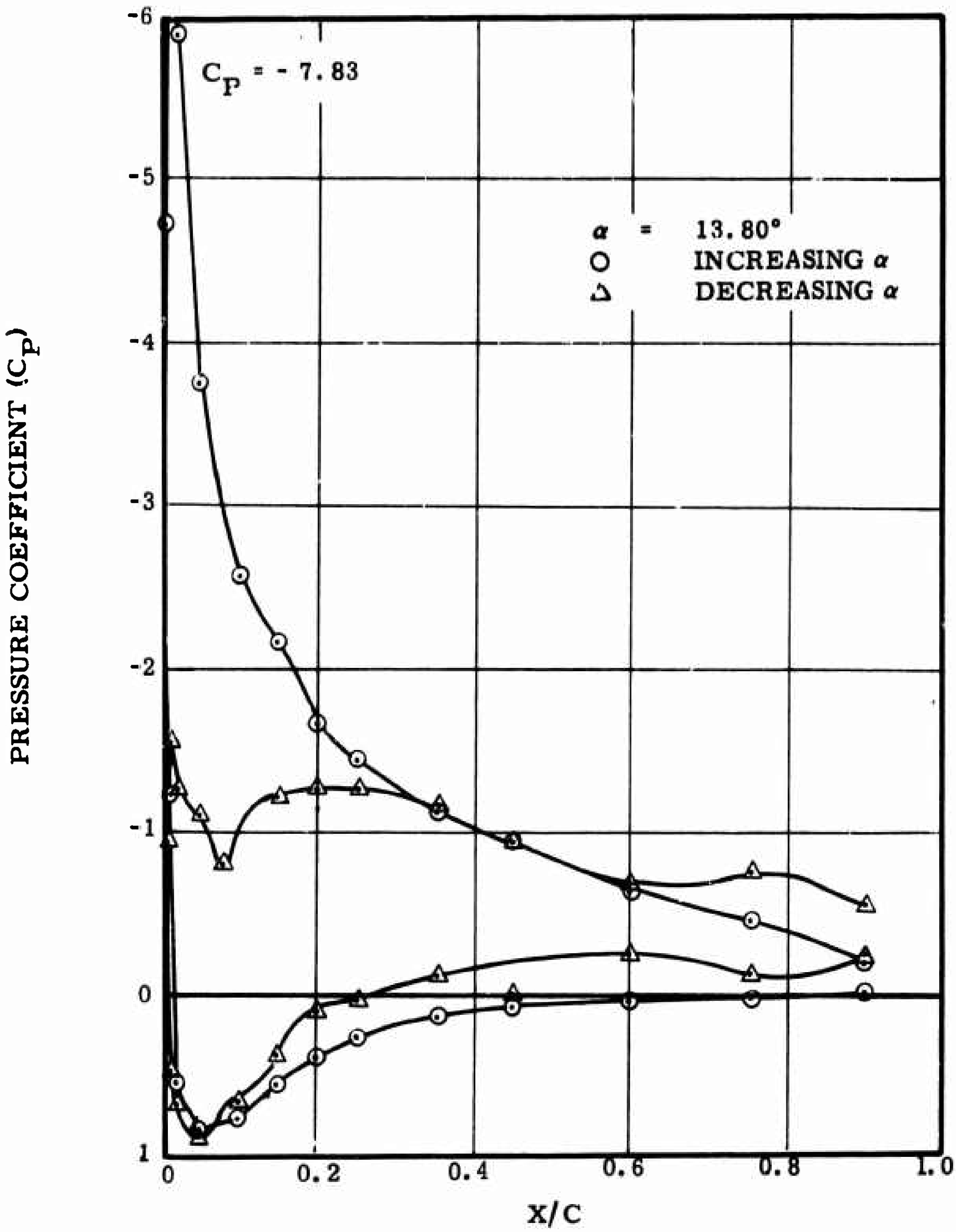
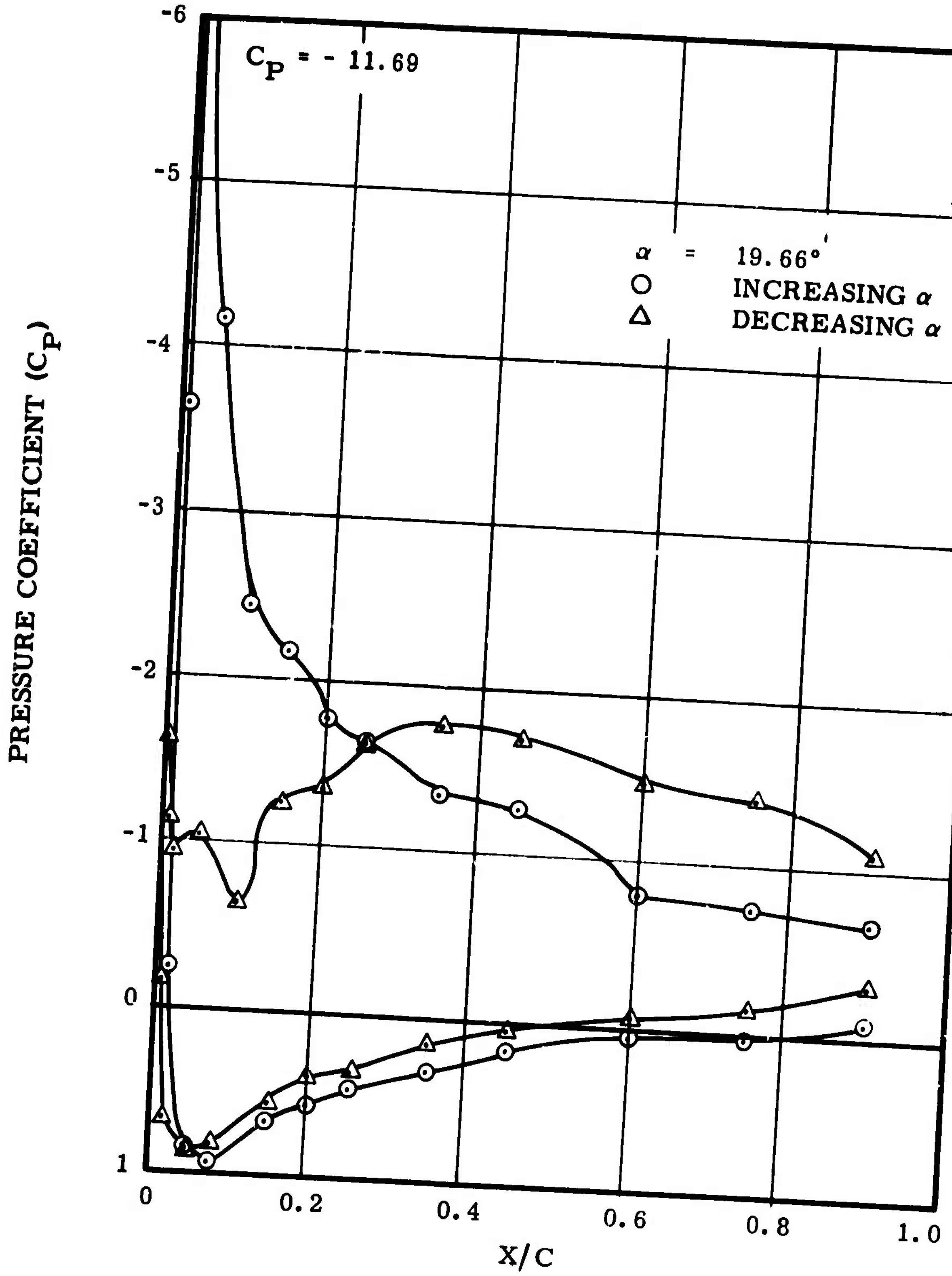


FIGURE 14. Instantaneous Pressure Distributions, α = 13.80°, $\Delta\alpha$ = 6.07°, k = .123.



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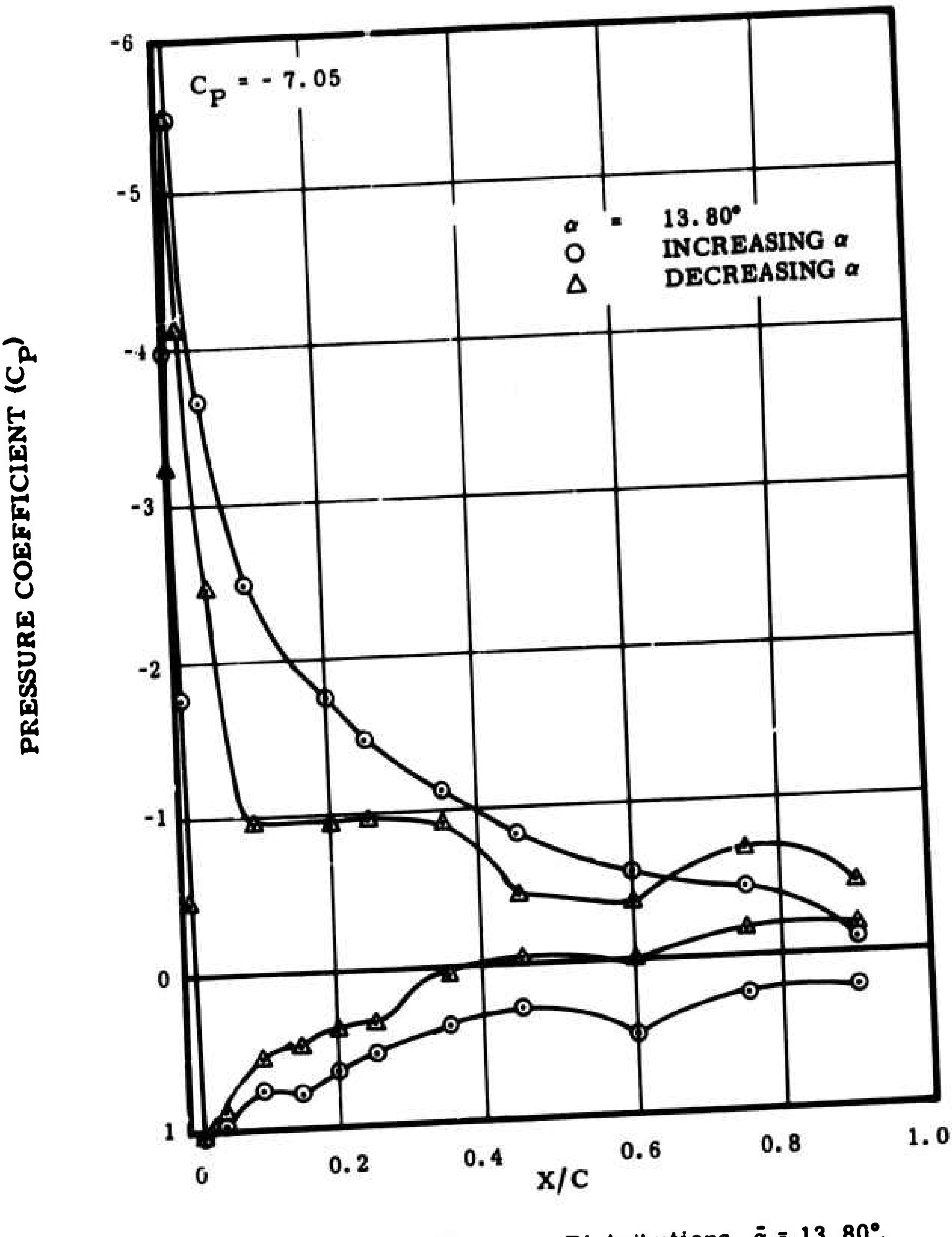
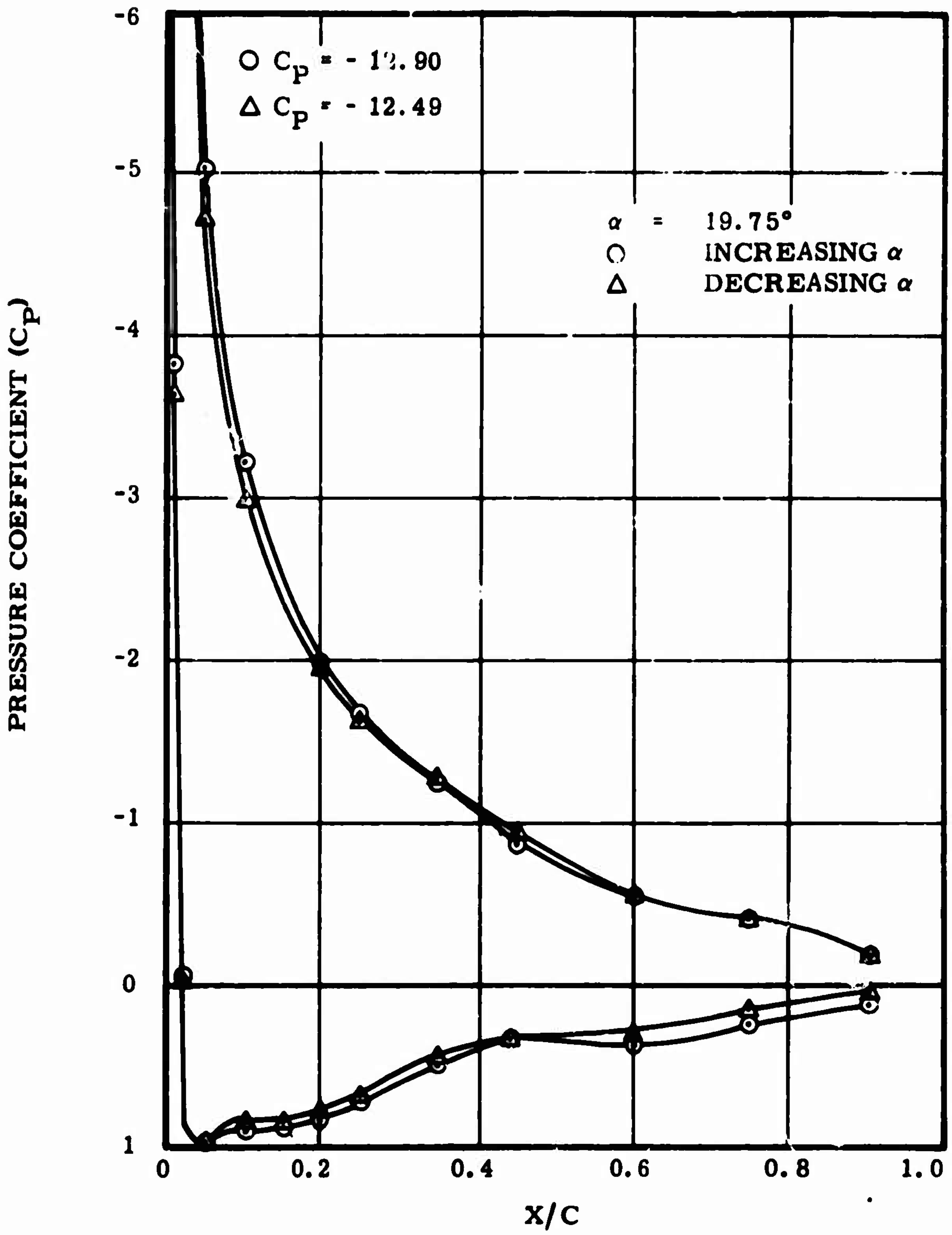


FIGURE 15. Instantaneous Pressure Distributions, $\bar{\alpha}$ = 13.80°, $\Delta\alpha$ = 6.17°, k = .266.



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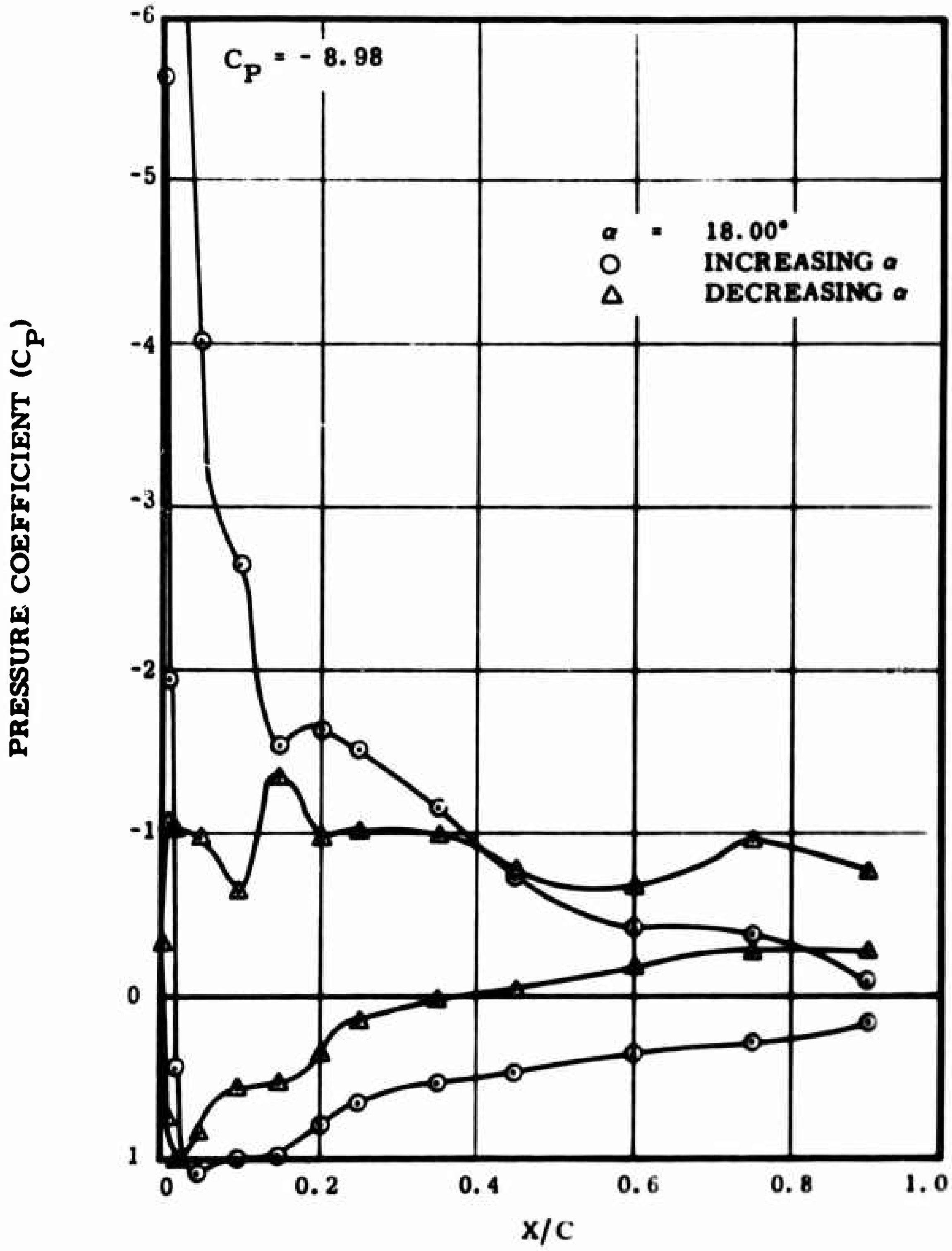
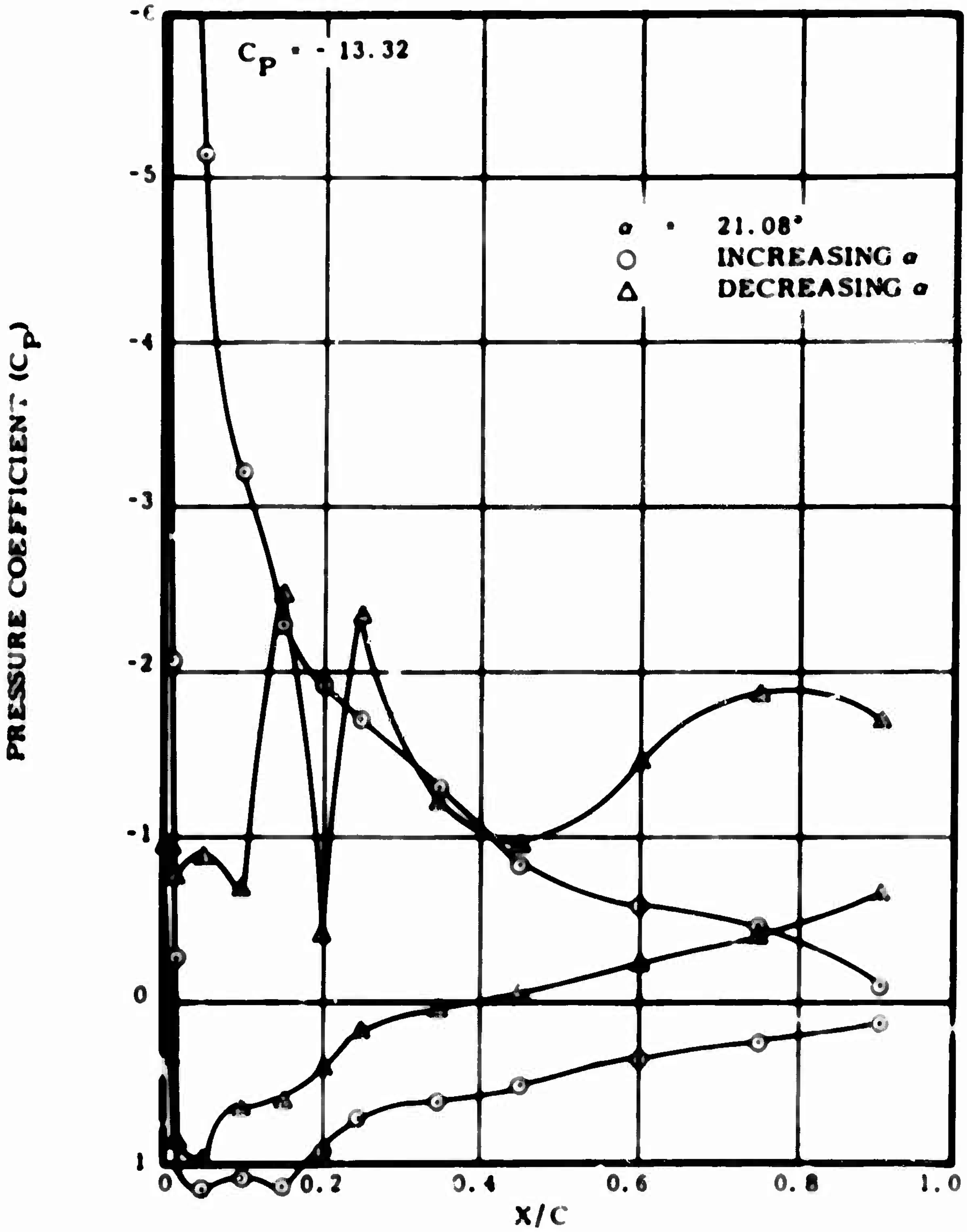


FIGURE 16. Instantaneous Pressure Distributions, $\bar{\alpha}$ = 18.00°, $\Delta\alpha$ = 617°, k = .266.



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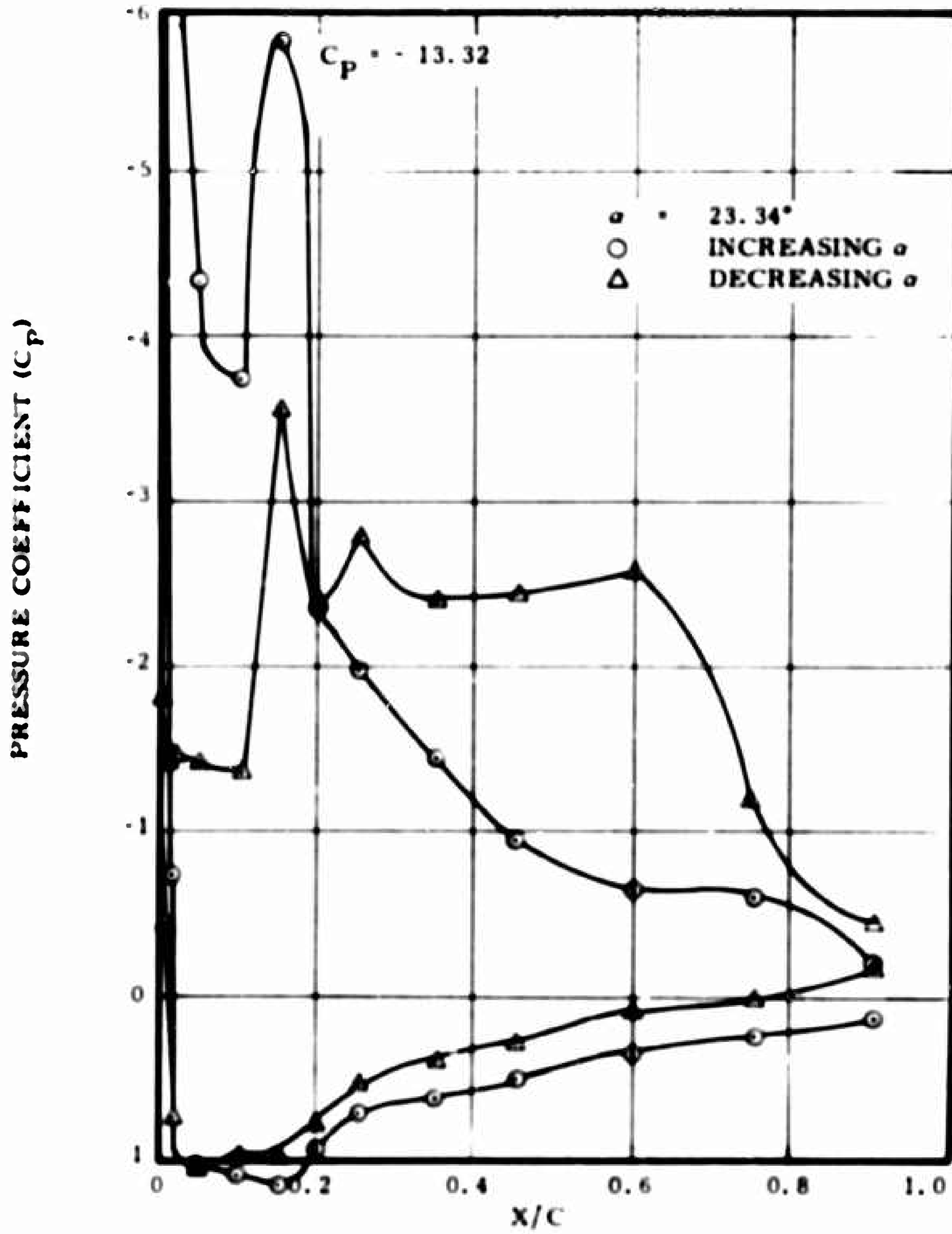

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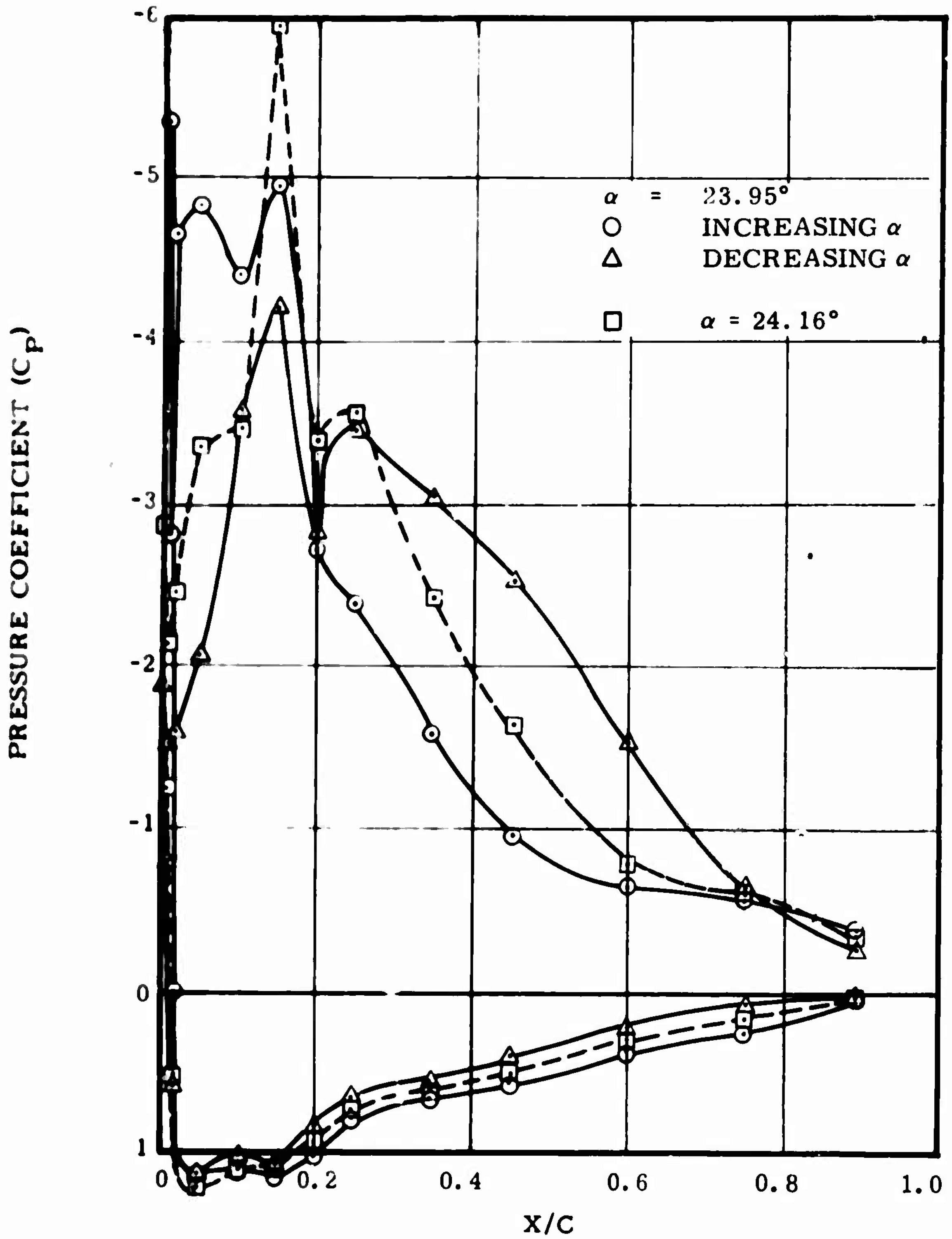

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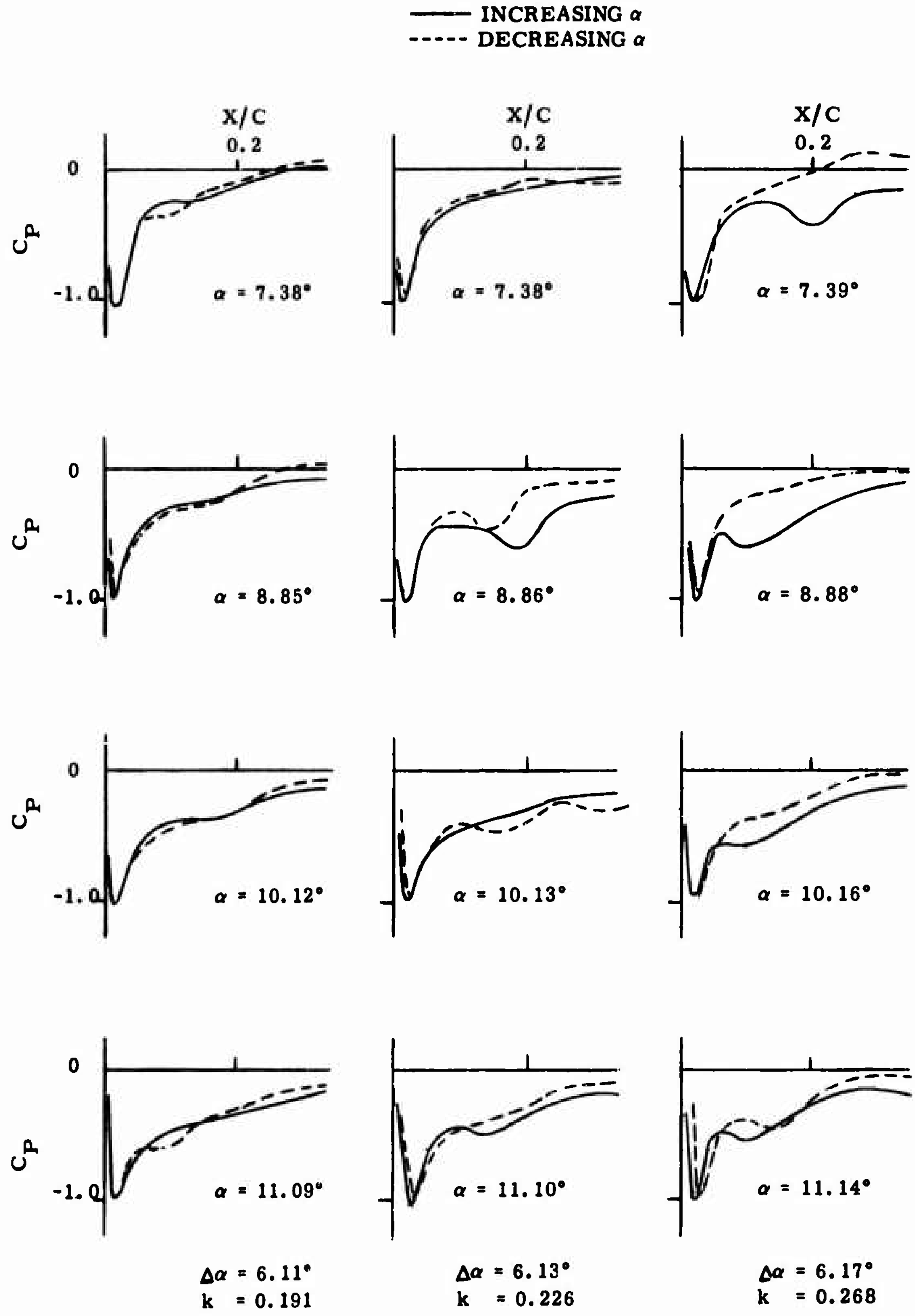


FIGURE 17. Instantaneous Lower Surface Leading Edge Pressure Distributions, $\bar{\alpha}$ = 5.80°.

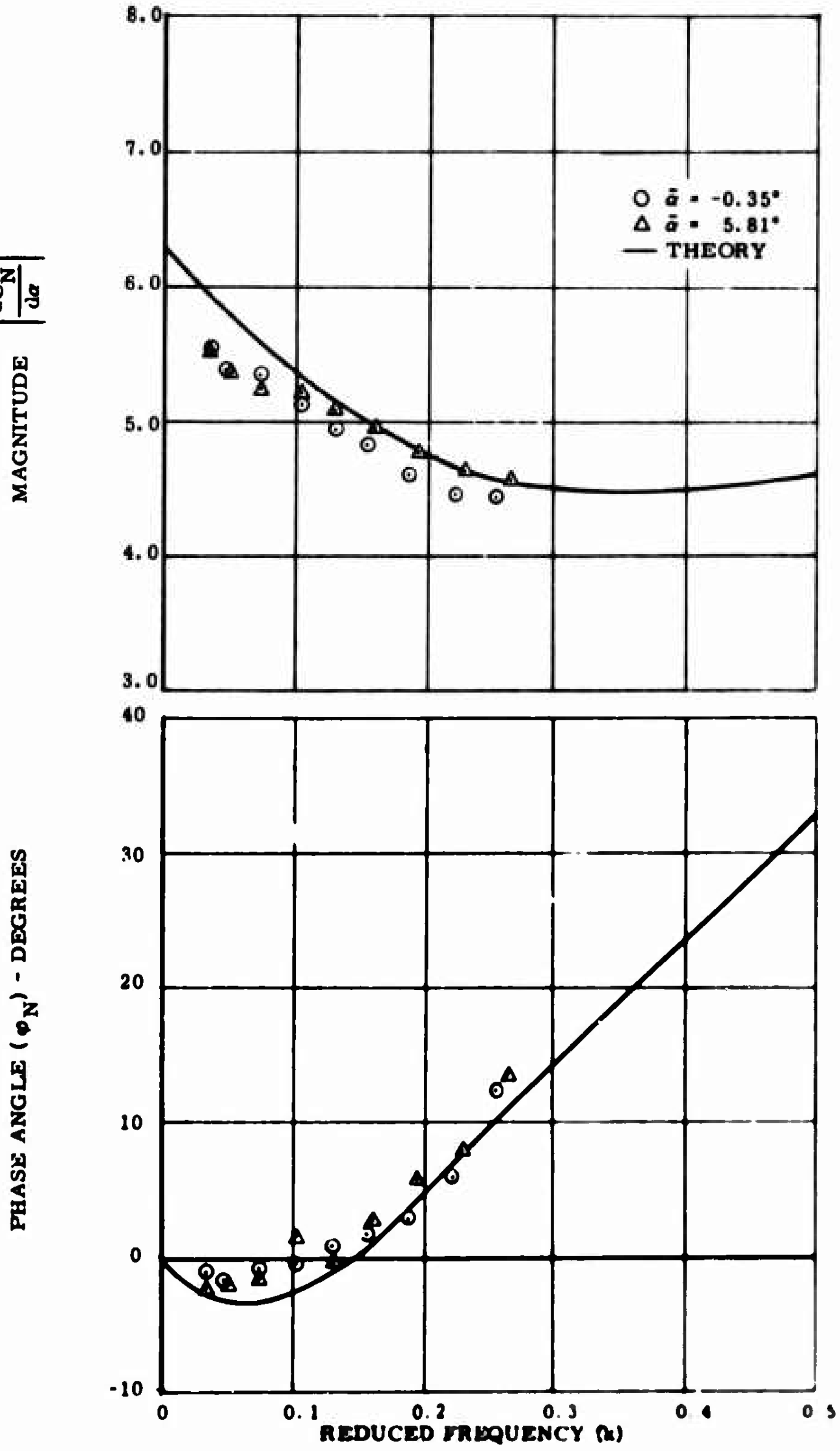


FIGURE 18. Variation of Normal Force Coefficient With Reduced Frequency for Force Model Oscillating in Pitch, Pitch Axis at 25% Chord, $\Delta\alpha$ = 6.08°.

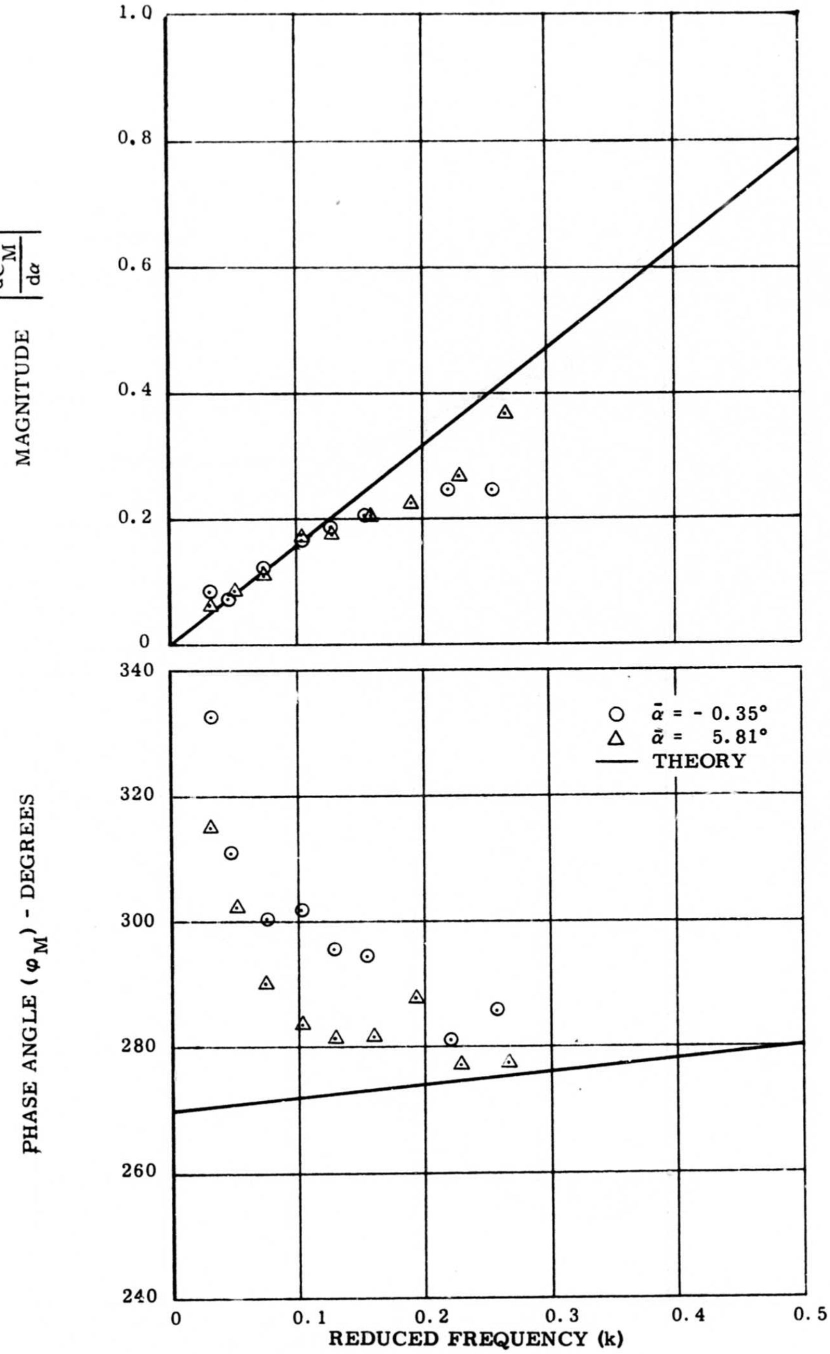


FIGURE 19. Variation of Pitching Moment Coefficient With Reduced Frequency for Force Model Oscillating in Pitch, Pitch Axis at 25% Chord, $\Delta\alpha$ = 6.08°.

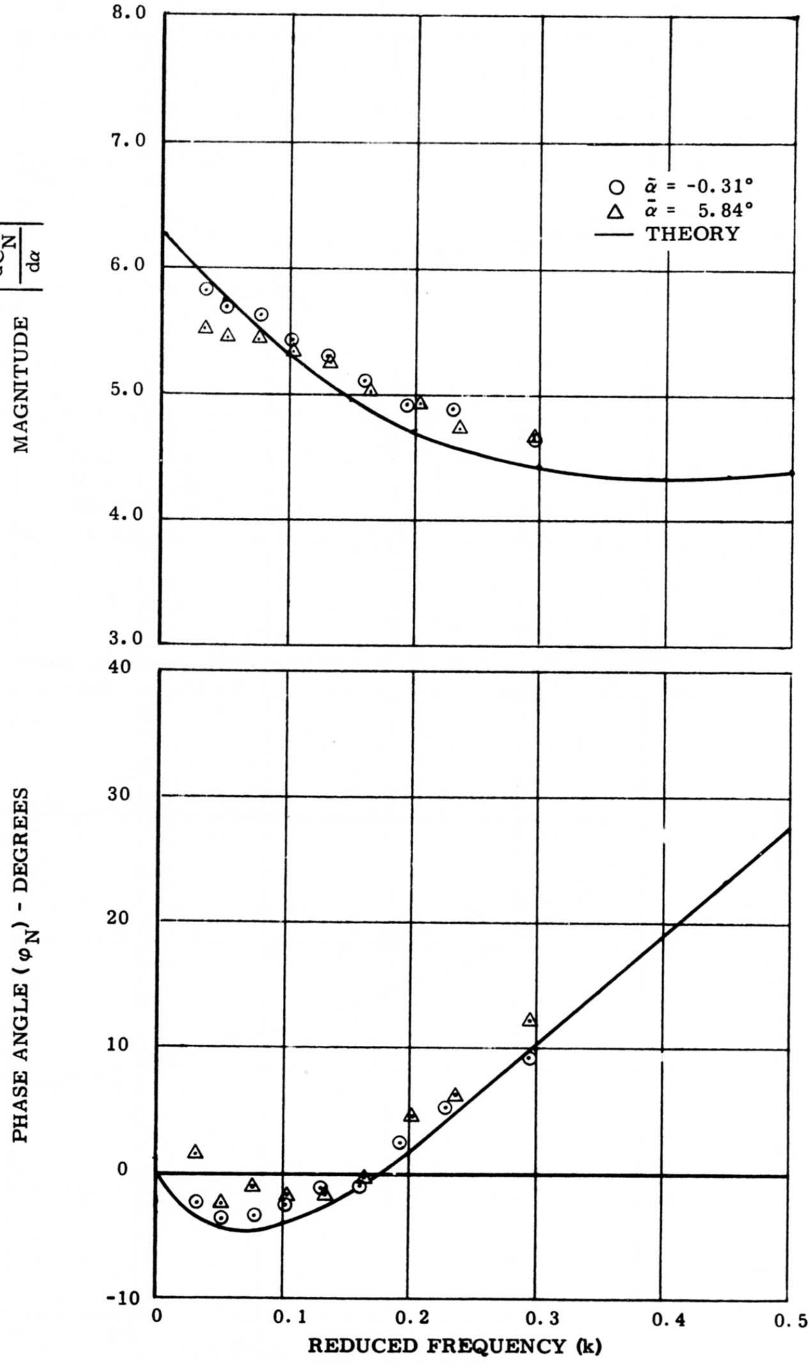


FIGURE 20. Variation of Normal Force Coefficient With Reduced Frequency for Force Model Oscillating in Pitch, Pitch Axis at 37% Chord, $\Delta\alpha$ = 6.08°.

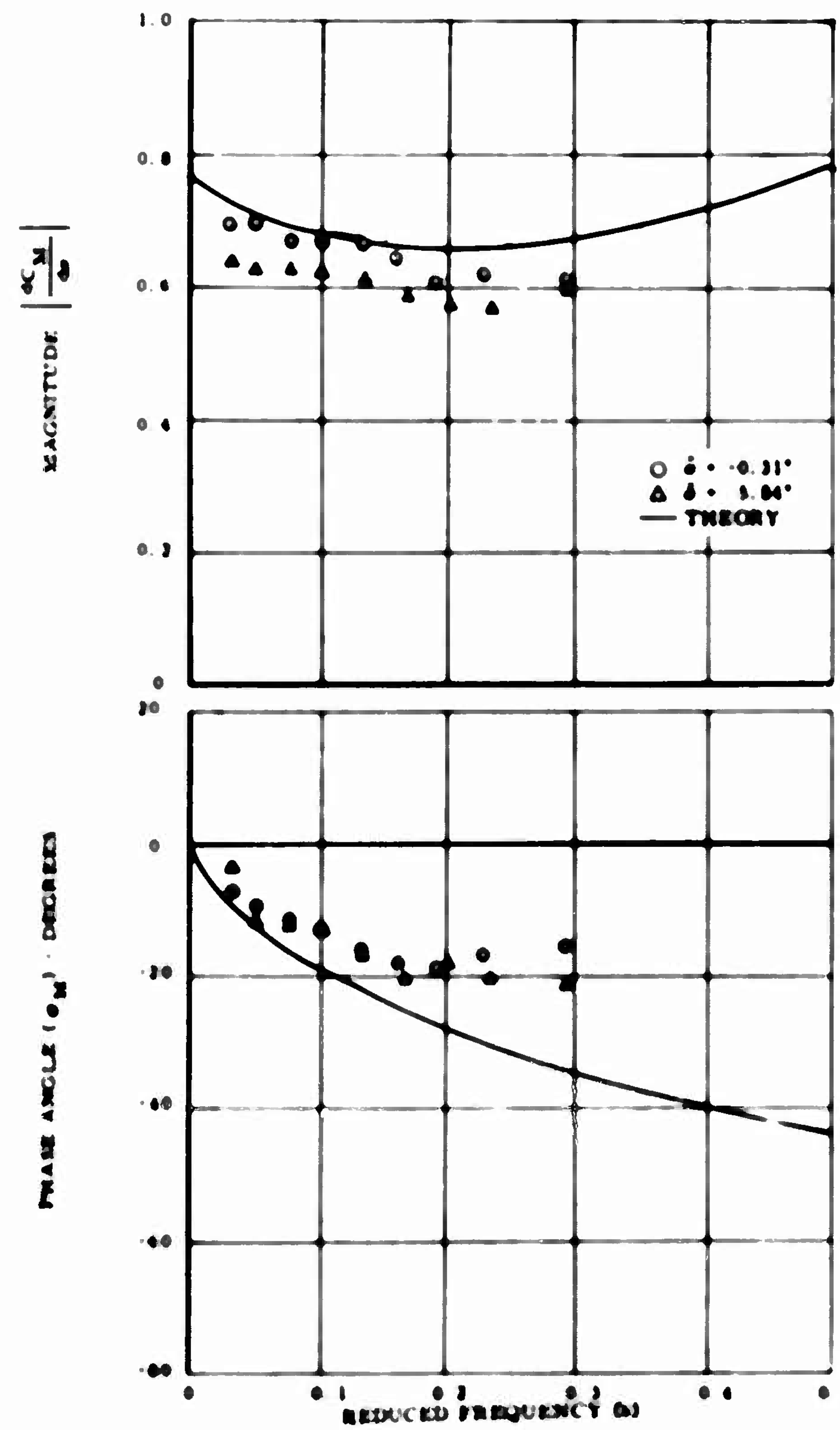


FIGURE 21. Variation of Pitching Moment Coefficient With Reduced Frequency for Force Model Oscillating in Pitch, Pitch Axis at 37% Chord. $\Delta\alpha = 6.08°$.

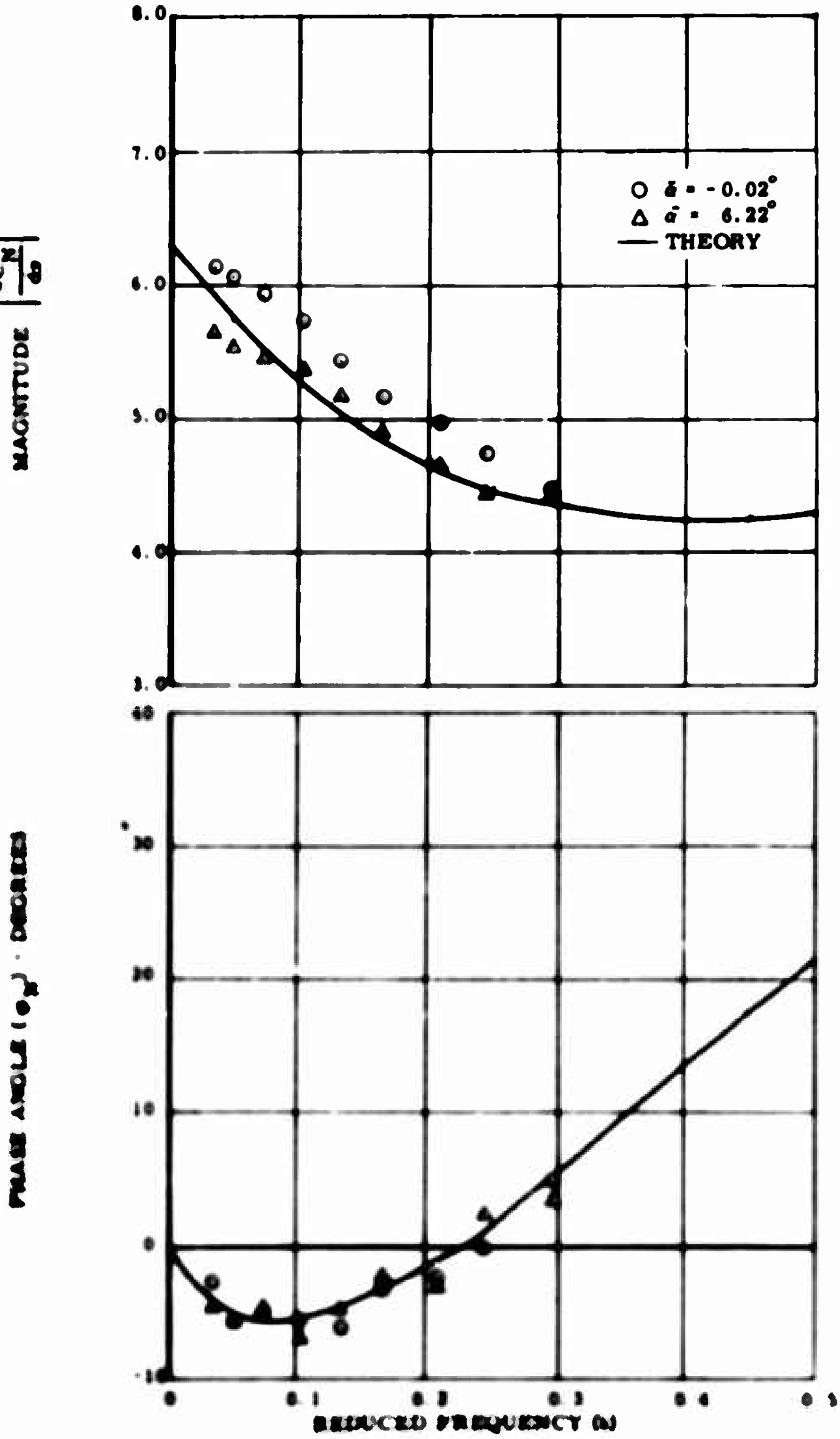


FIGURE 22. Variation of Normal Force Coefficient With Reduced Frequency for Force Model Oscillating in Pitch. Pitch Axis at 50% Chord. $\Delta\alpha = 6.08°$.

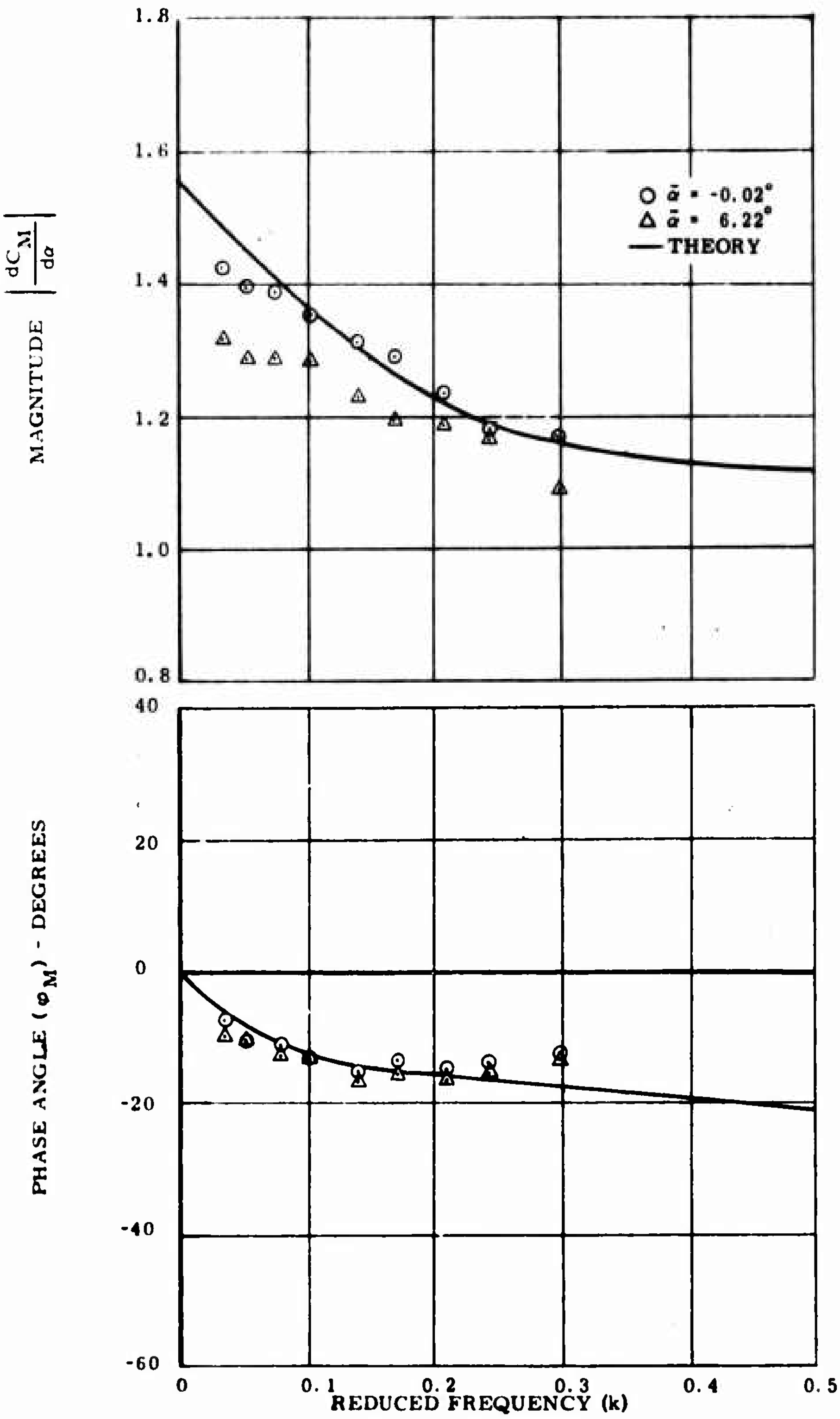


FIGURE 23. Variation of Pitching Moment Coefficient With Reduced Frequency for Force Model Oscillating in Pitch, Pitch Axis at 50% Chord, $\Delta\alpha$ = 6.08°.

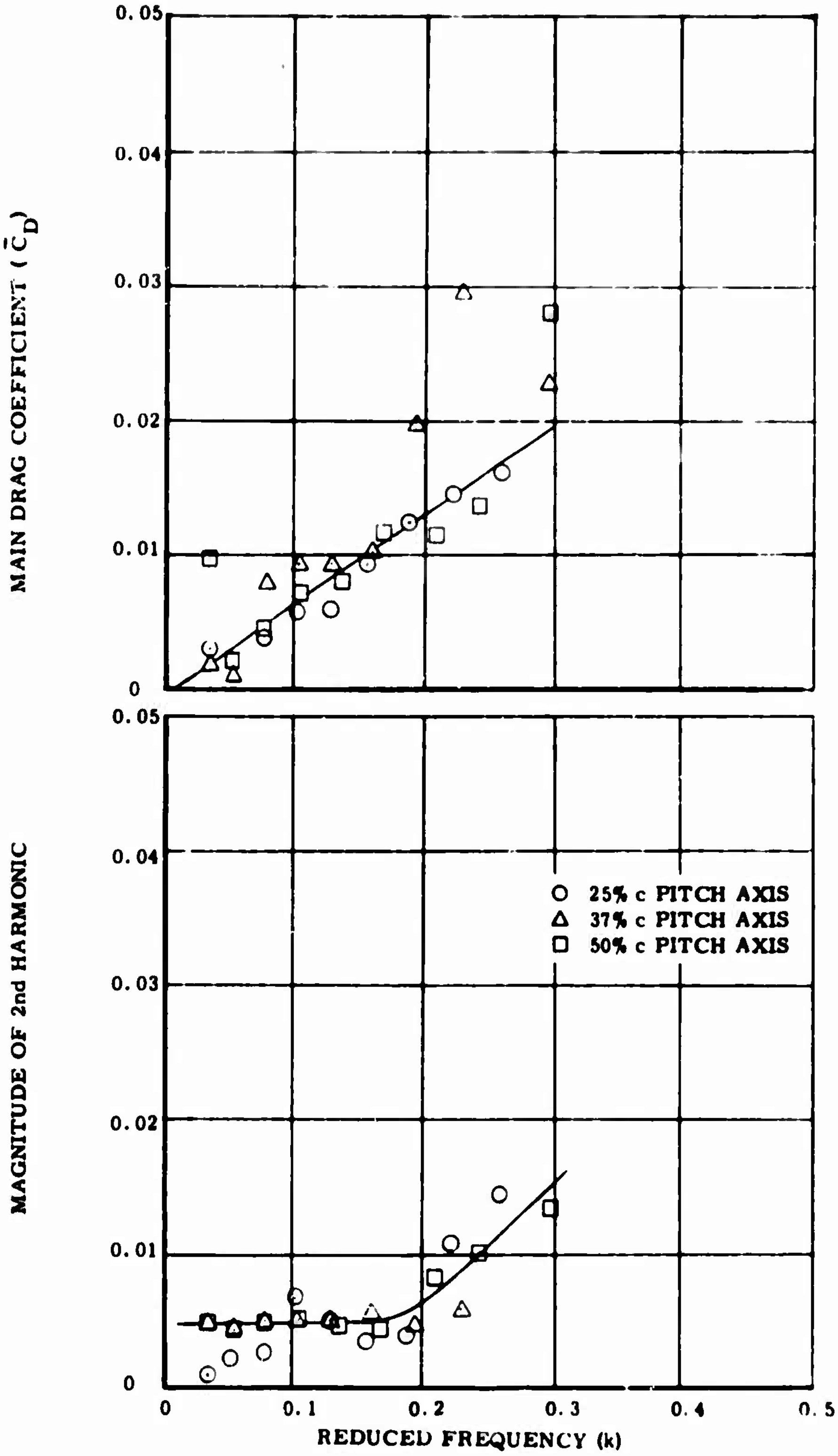


FIGURE 24. Variation of Drag Coefficient With Reduced Frequency, $\bar{\alpha} \approx 0°$.

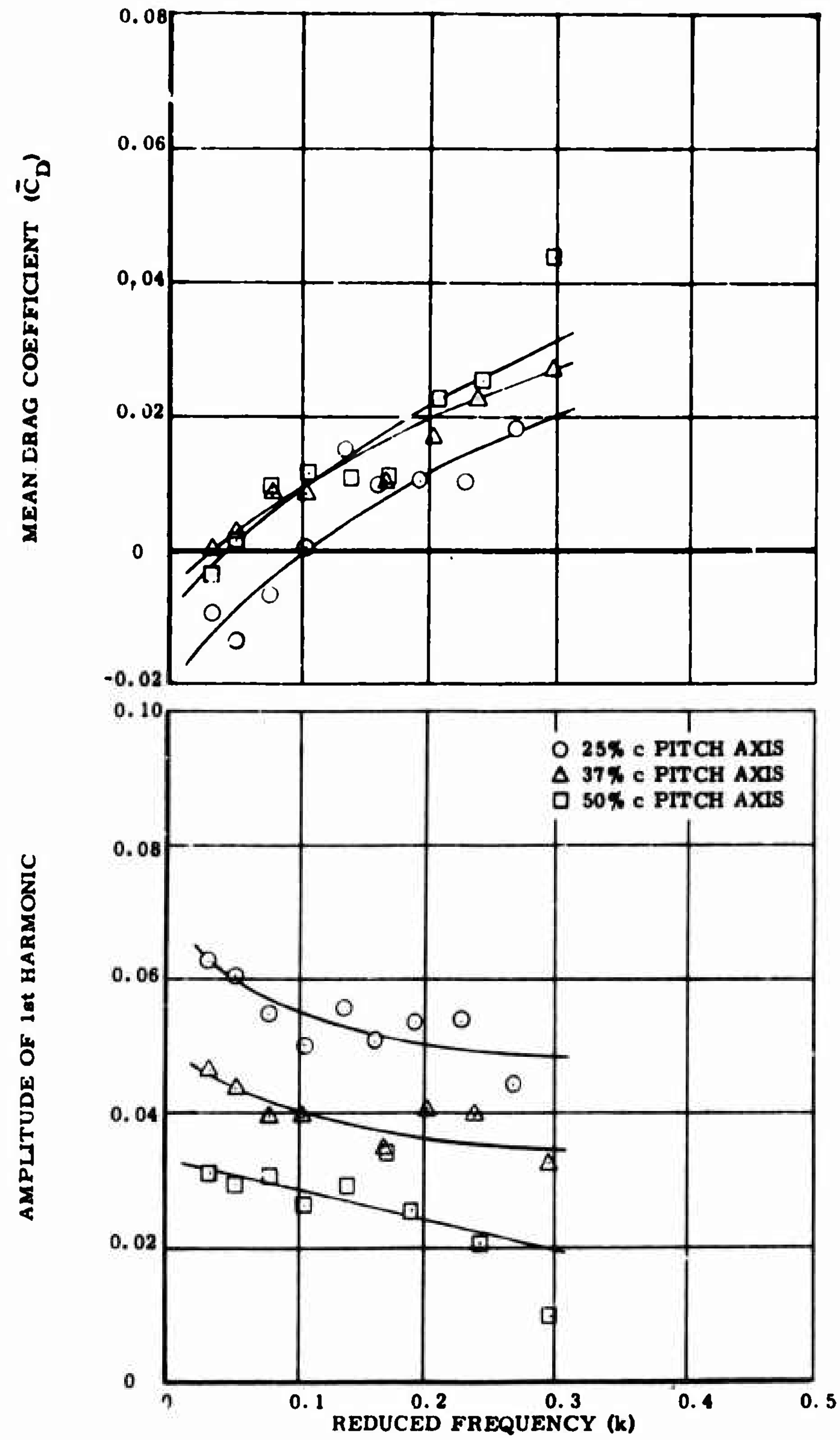


FIGURE 25. Variation of Drag Coefficient With Reduced Frequency, $\bar{\alpha} \approx 6°$.

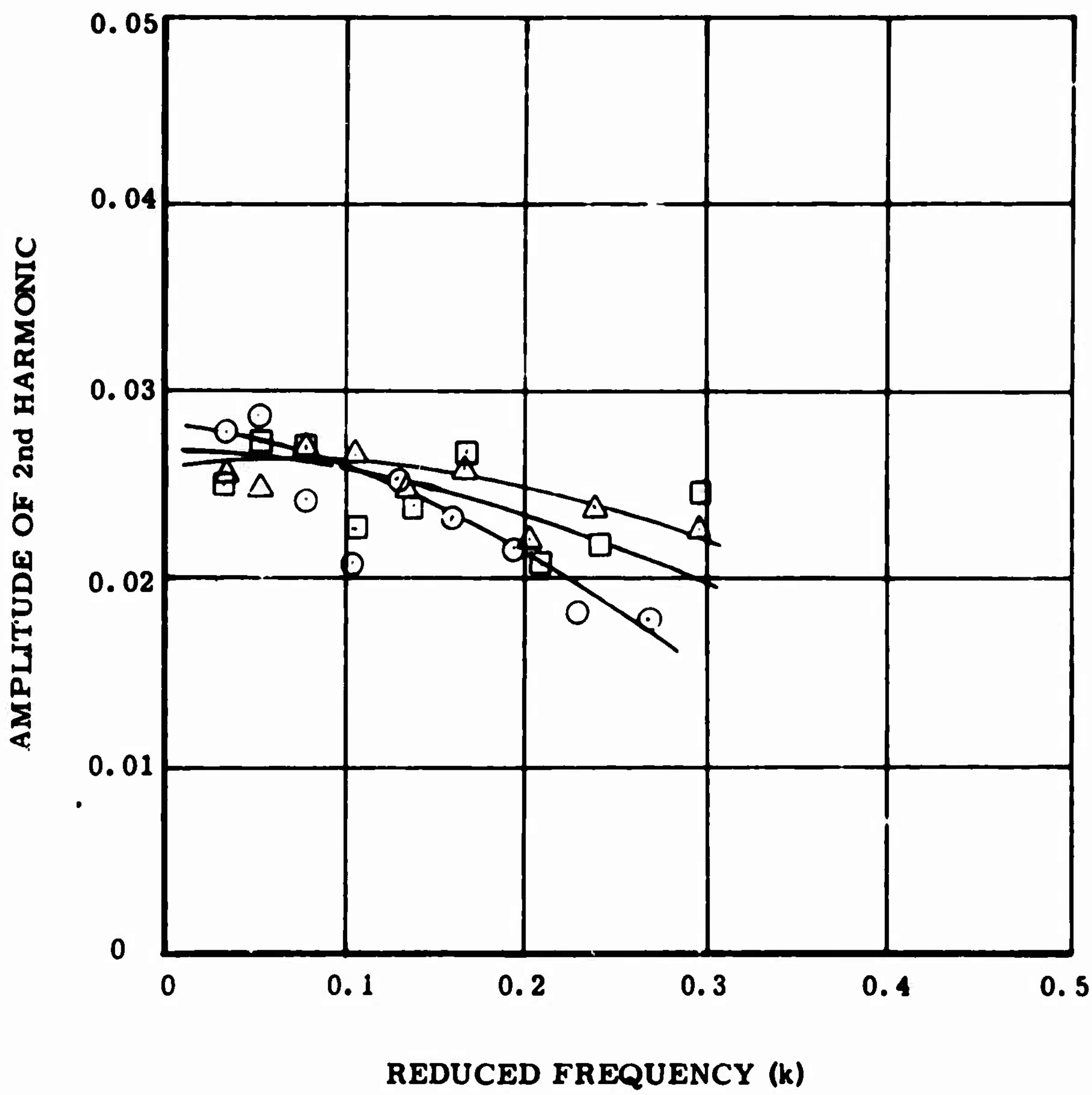


FIGURE 25. Continued

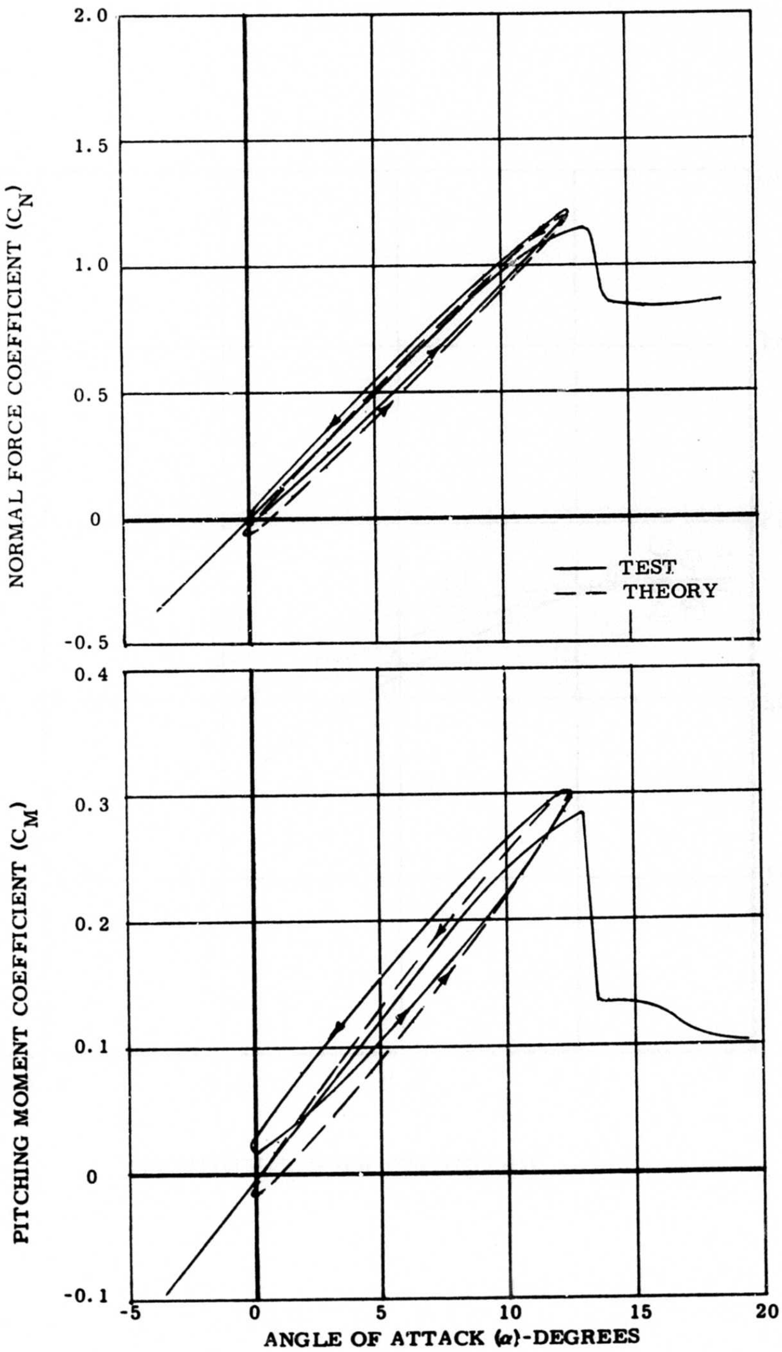


FIGURE 26. Dynamic C_N and C_M for 50% Pitch Axis Model Oscillating at Low Frequency About $\bar{\alpha}$ = 6.22°, k = .032, $\Delta\alpha$ = 6.30°.

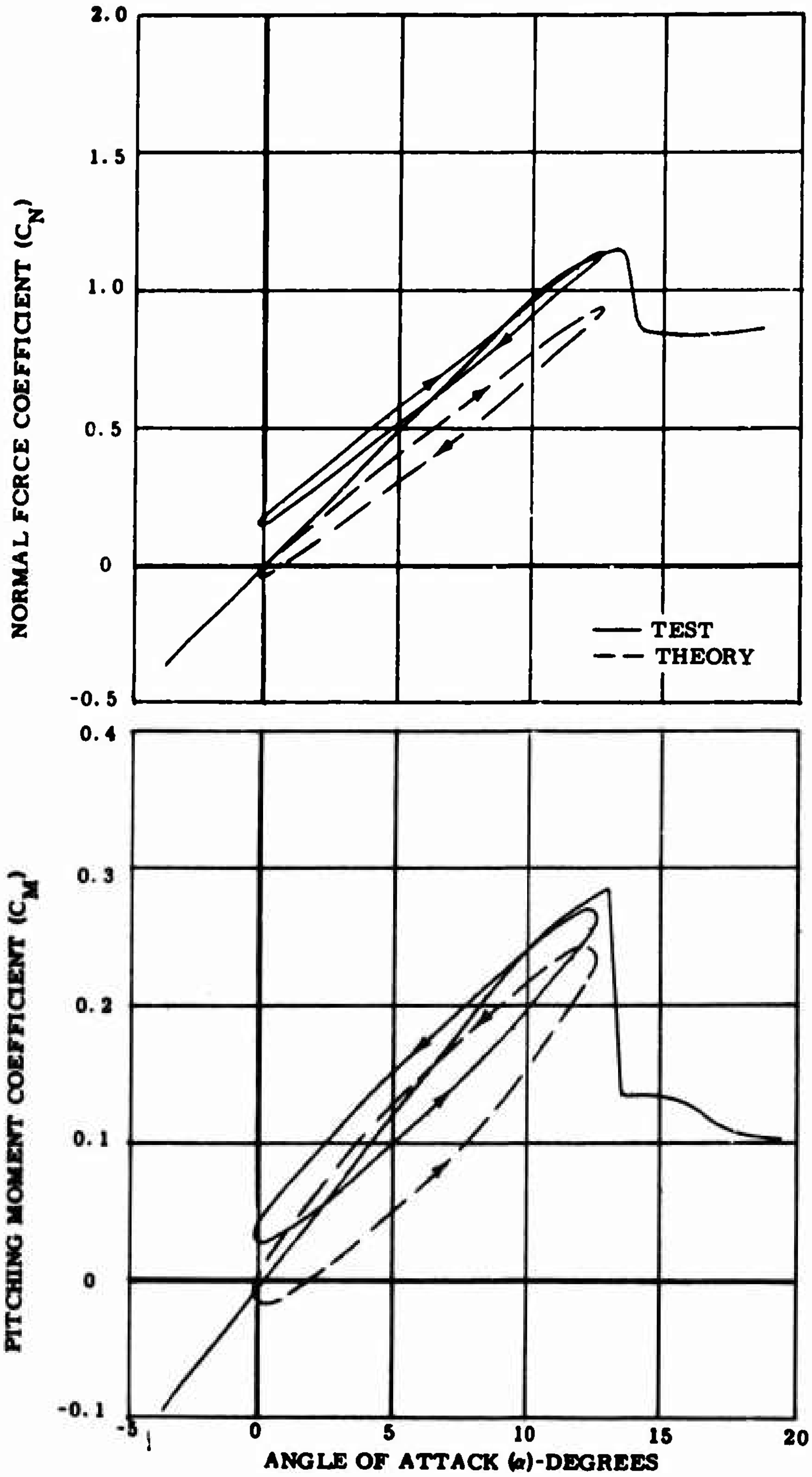


FIGURE 27. Dynamic C_N and C_M for 50% Pitch Axis Model Oscillating at High Frequency About $\bar{\alpha}$ = 6.22°, k = .297, $\Delta\alpha$ = 6.38°.

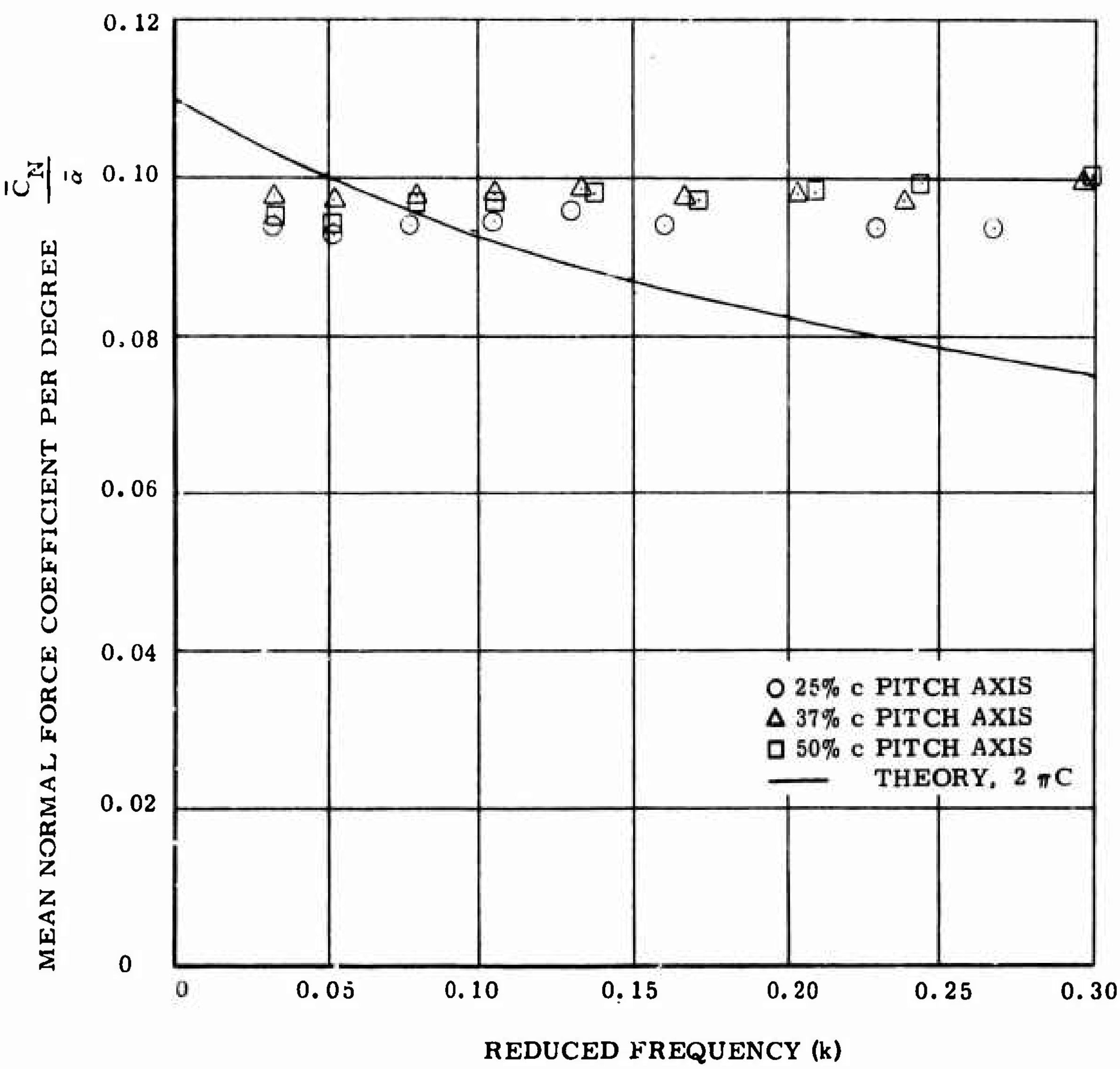


FIGURE 28. Variation of Normal Force Mean Values With Reduced Frequency.

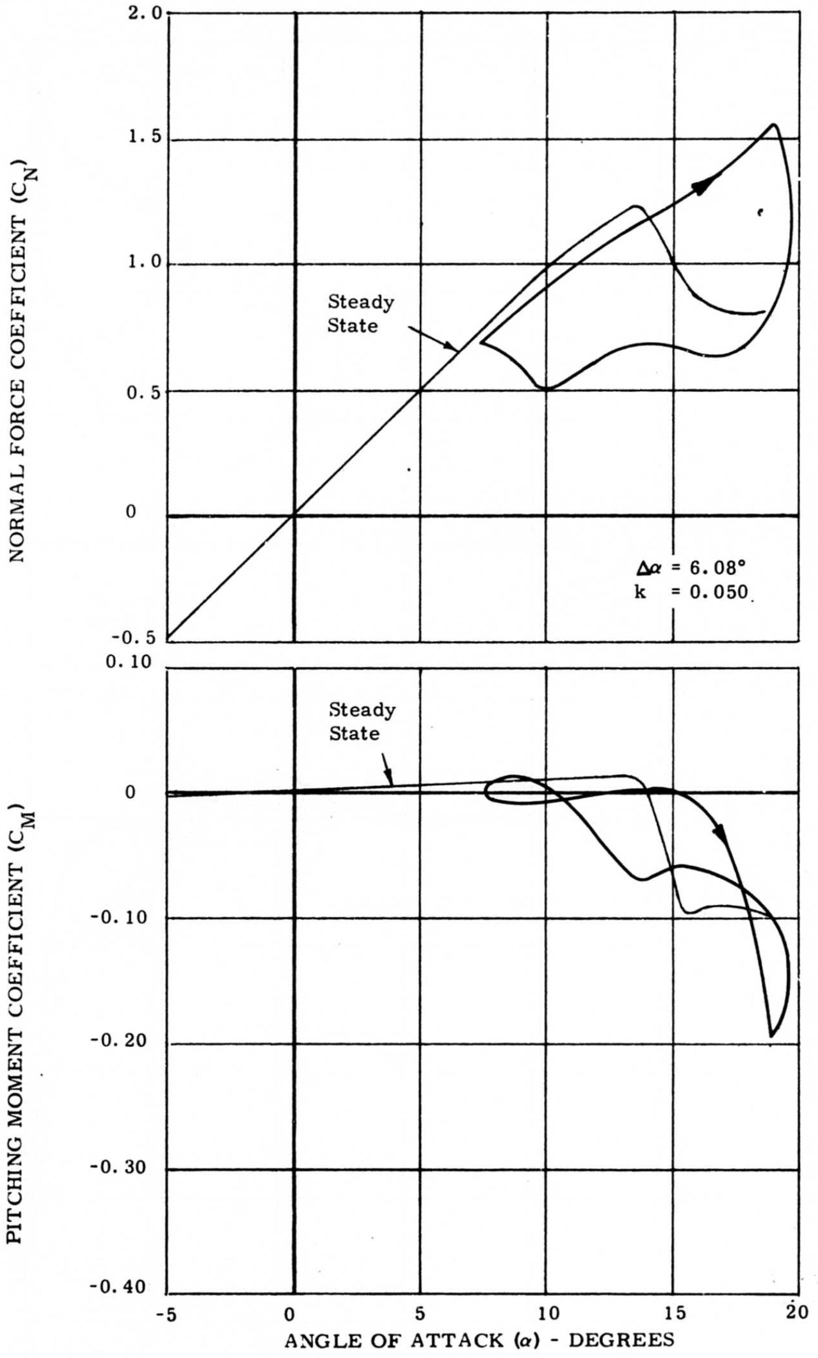


FIGURE 29. Effect of Frequency on Dynamic C_N and C_M, Pitch Axis = 25% Chord, $\bar{\alpha}$ = 13.56°.

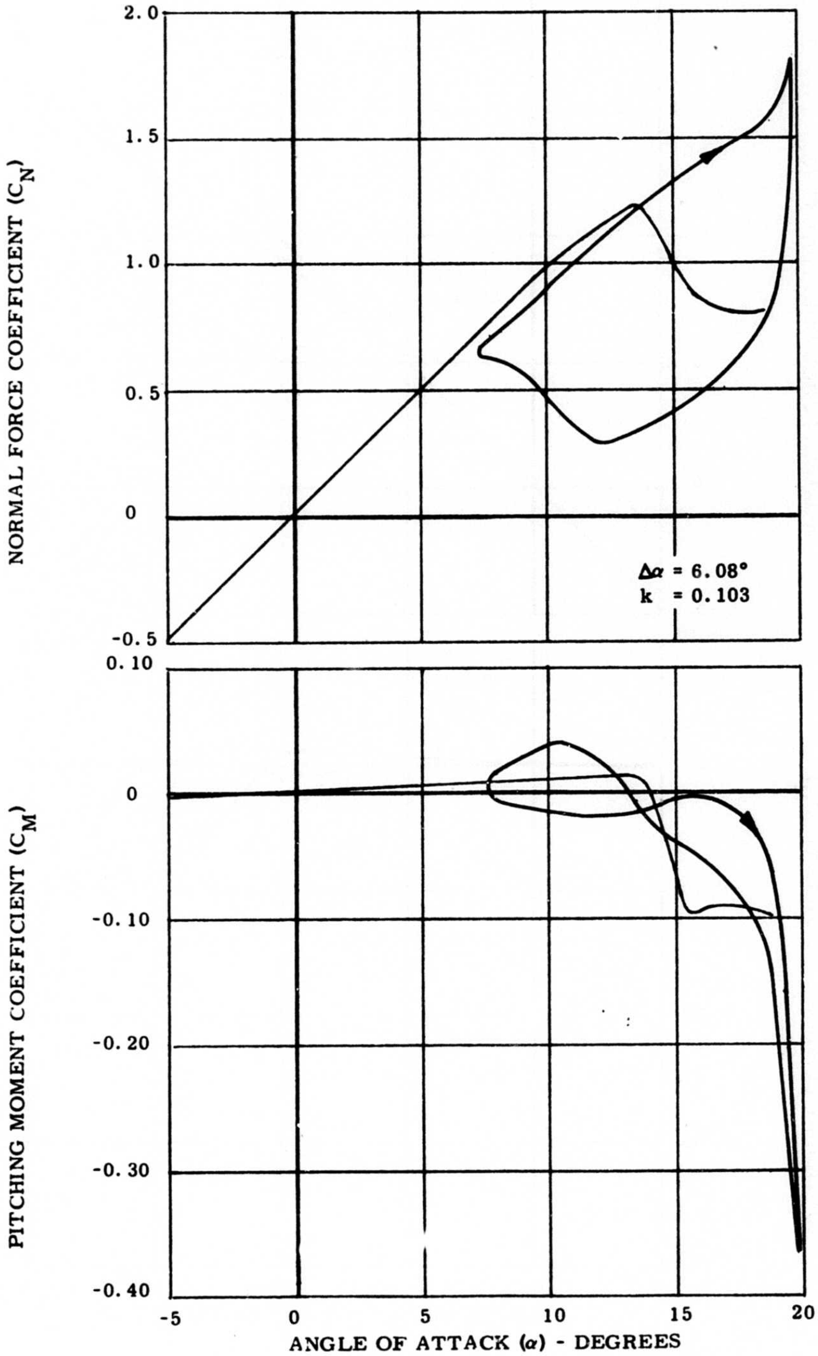
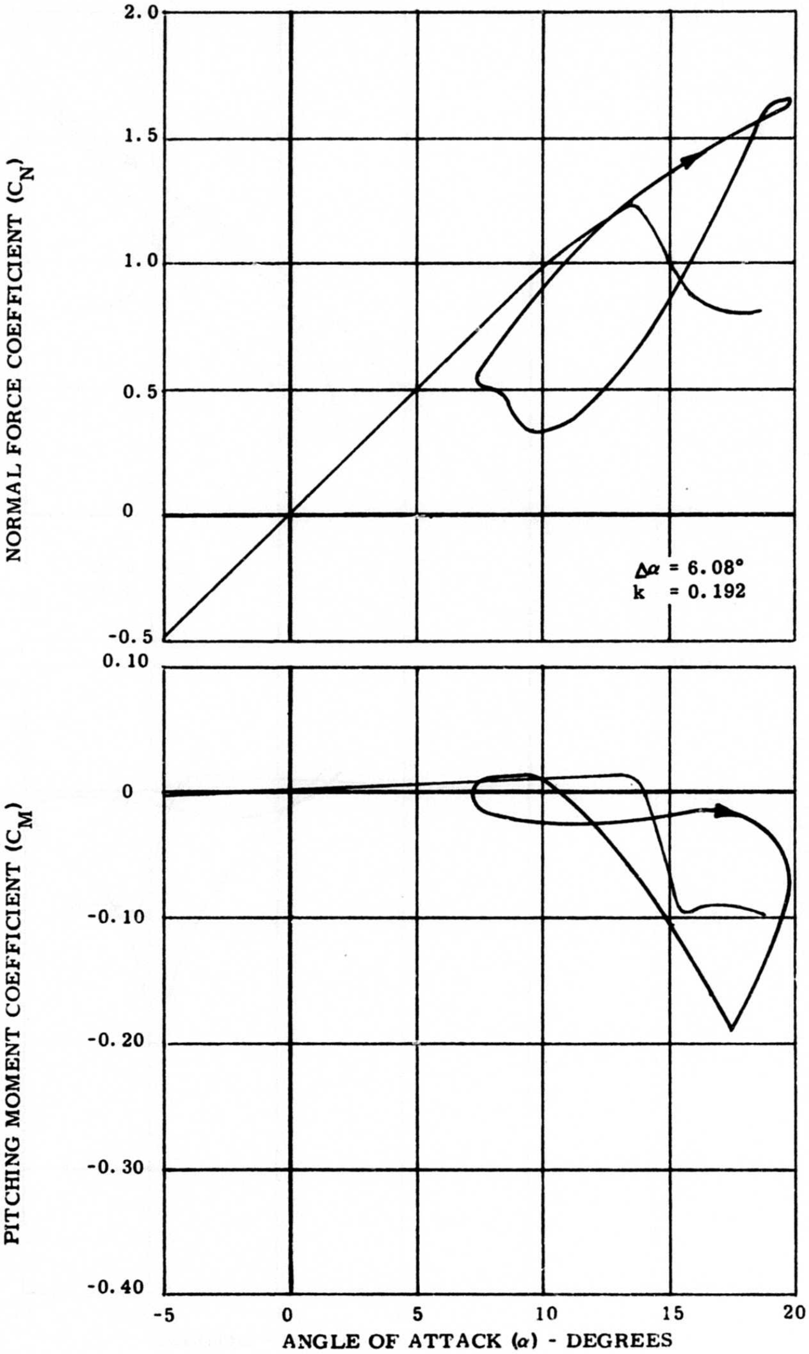


FIGURE 29. Continued



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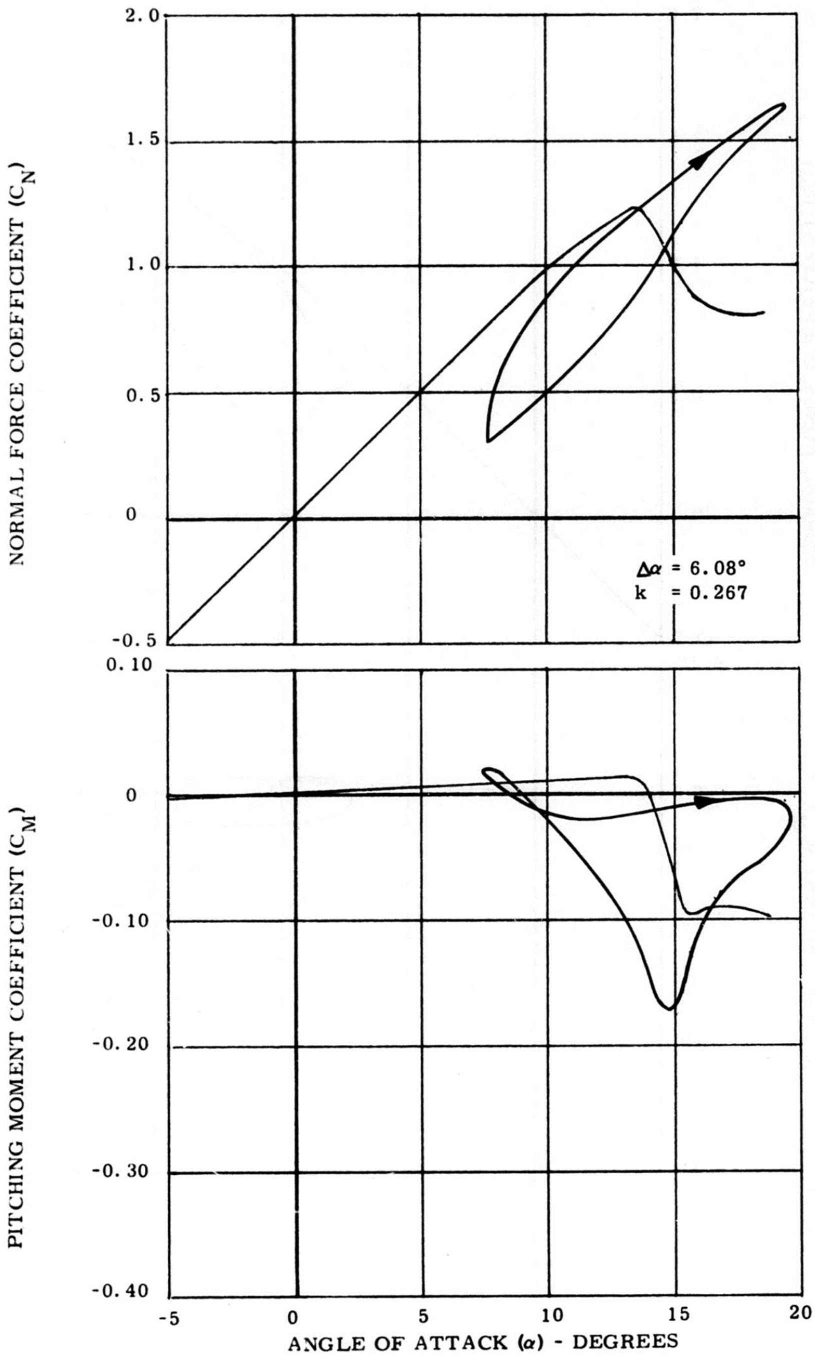

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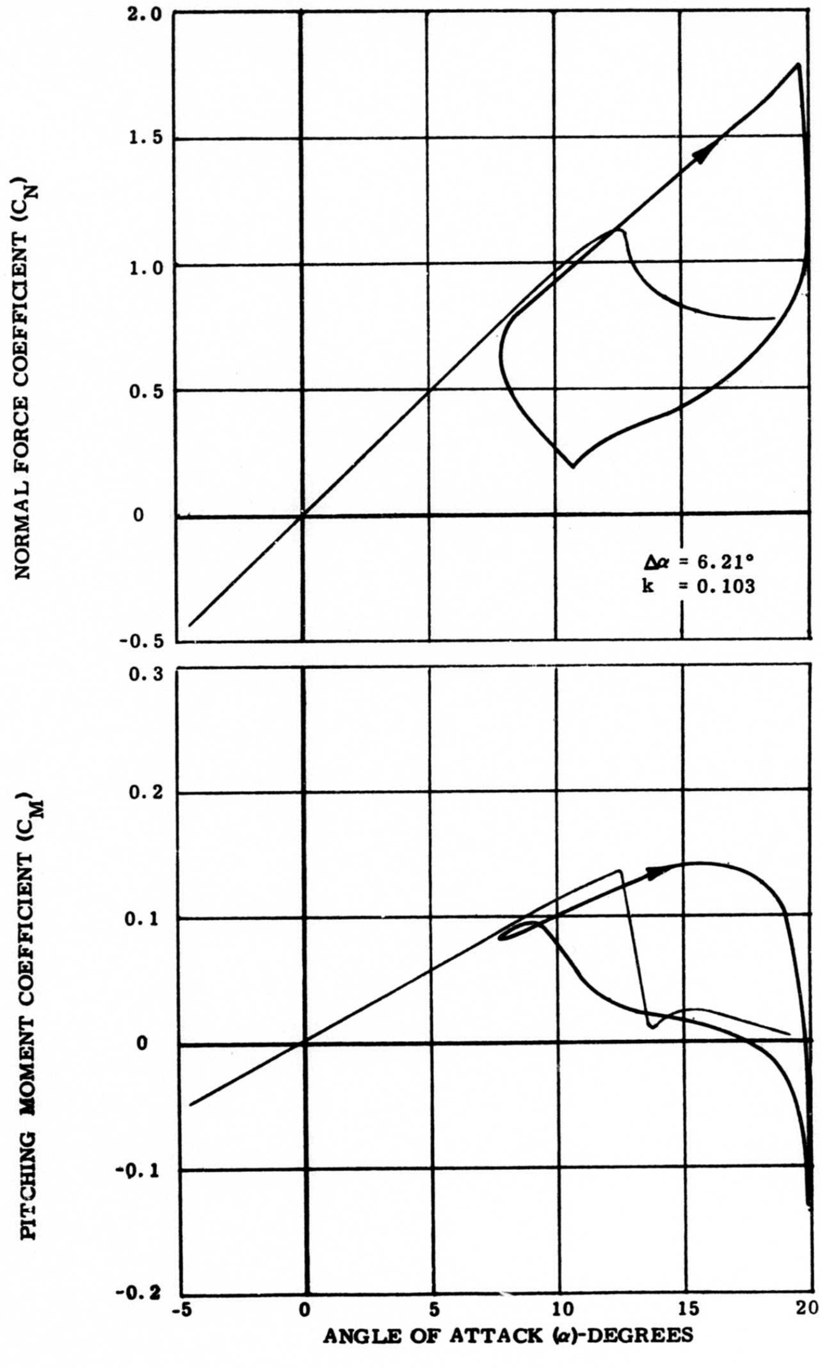

FIGURE 30. Continued

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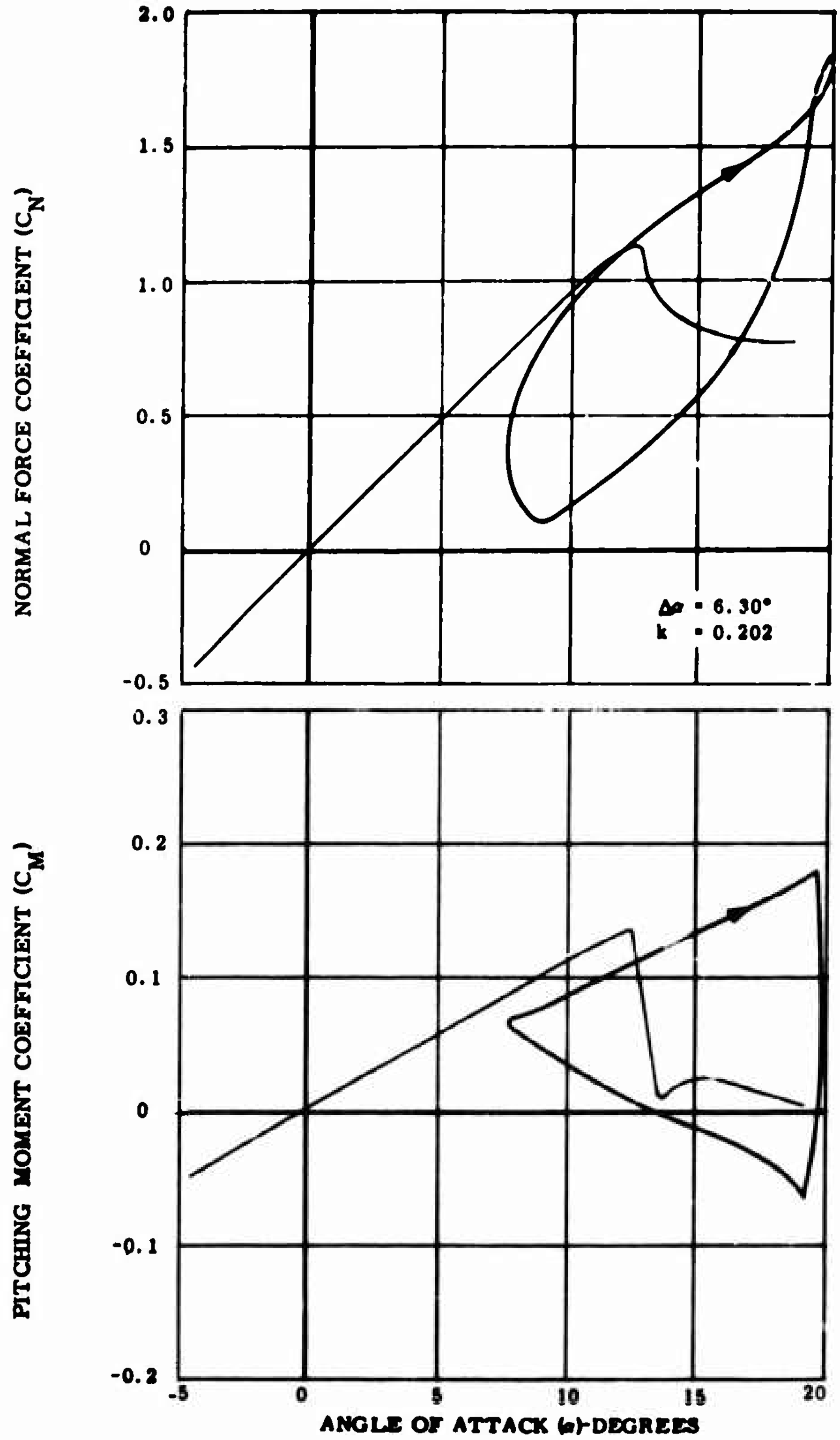

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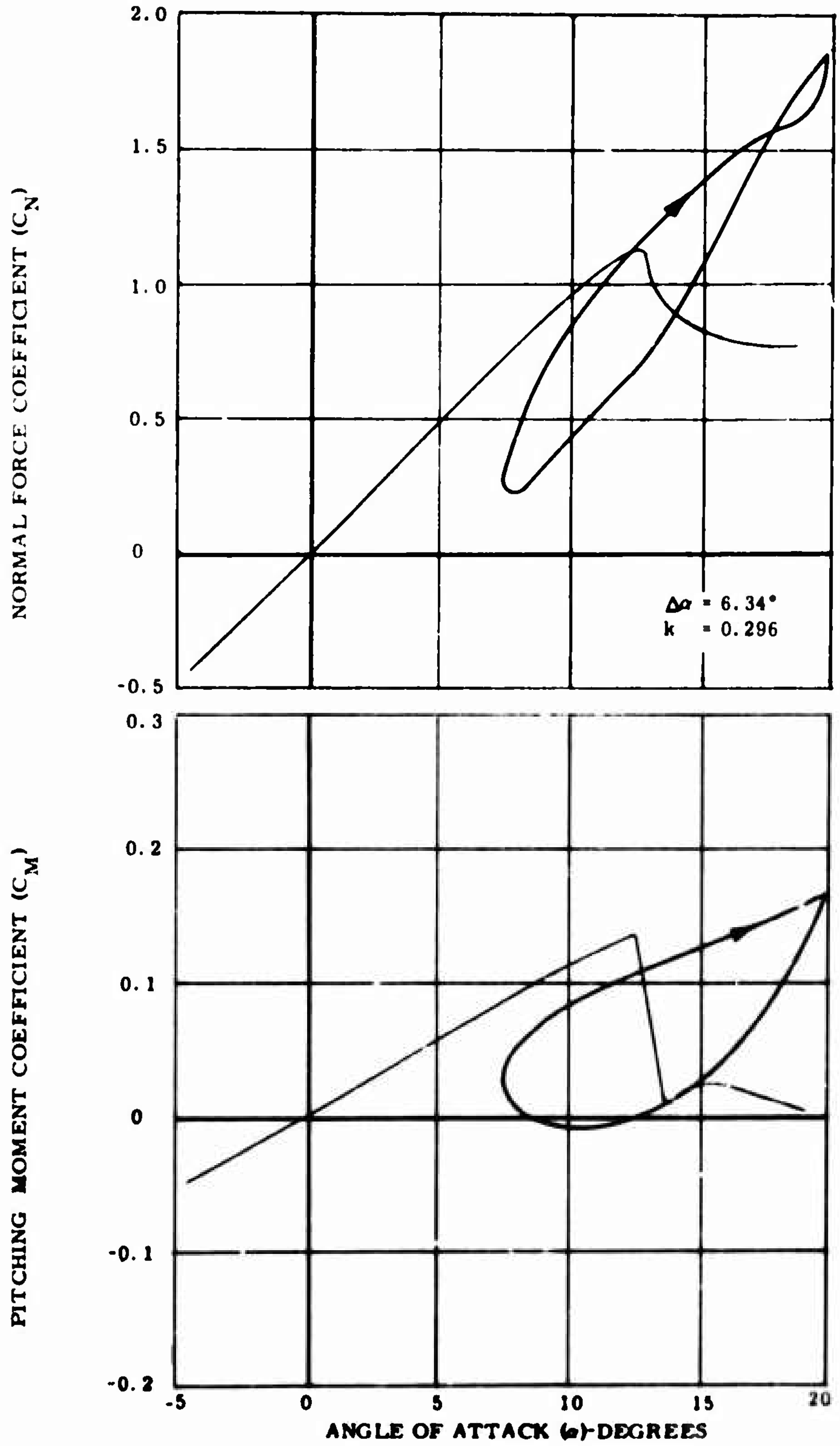

FIGURE 30. Continued

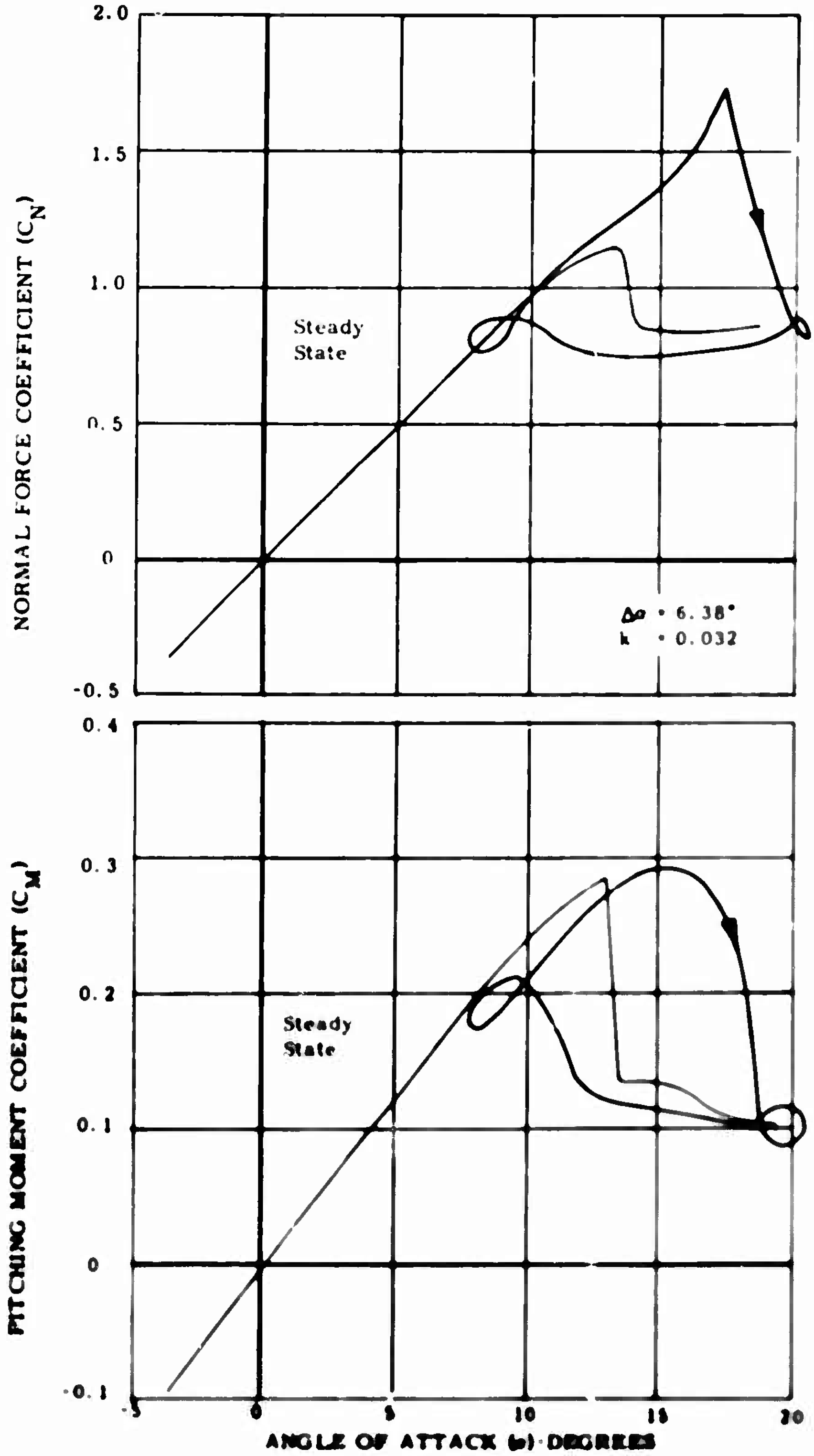

FIGURE 31. Effect of Frequency on Dynamic C_N and C_M. Pitch Axis = 50% Chord, $\dot{\alpha}$ = 14.25°.

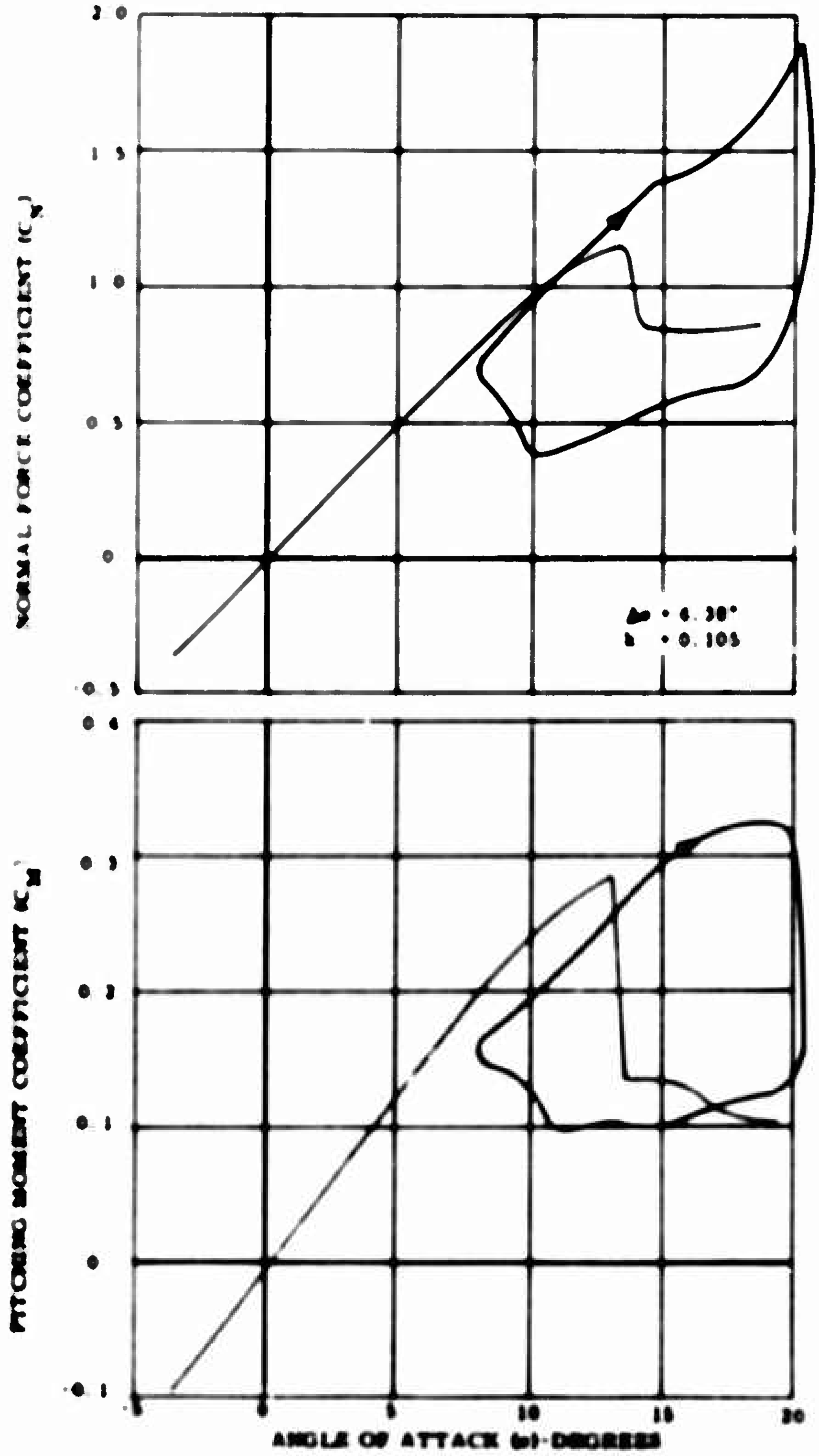

FIGURE 31. Continued

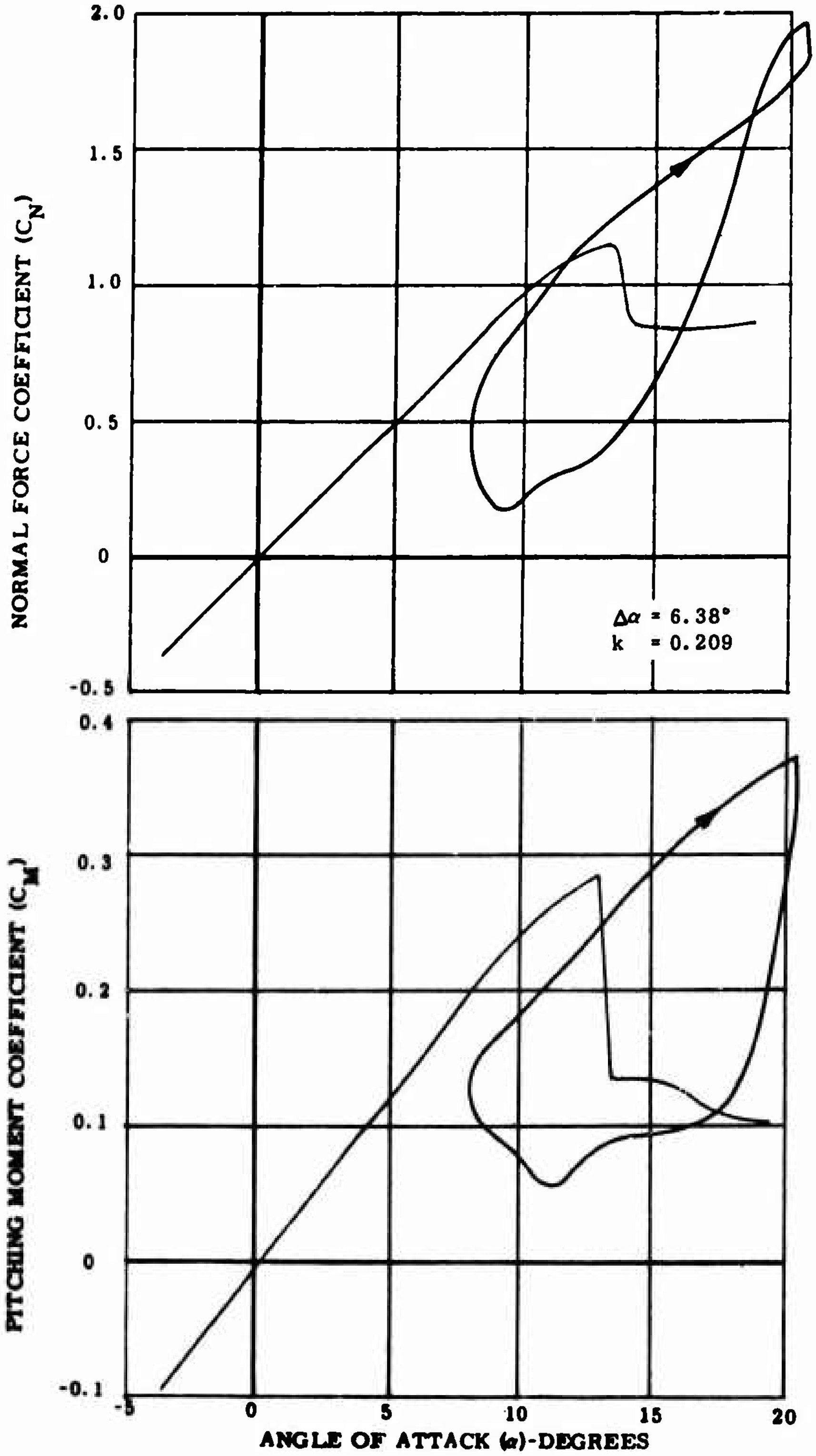

FIGURE 31. Continued

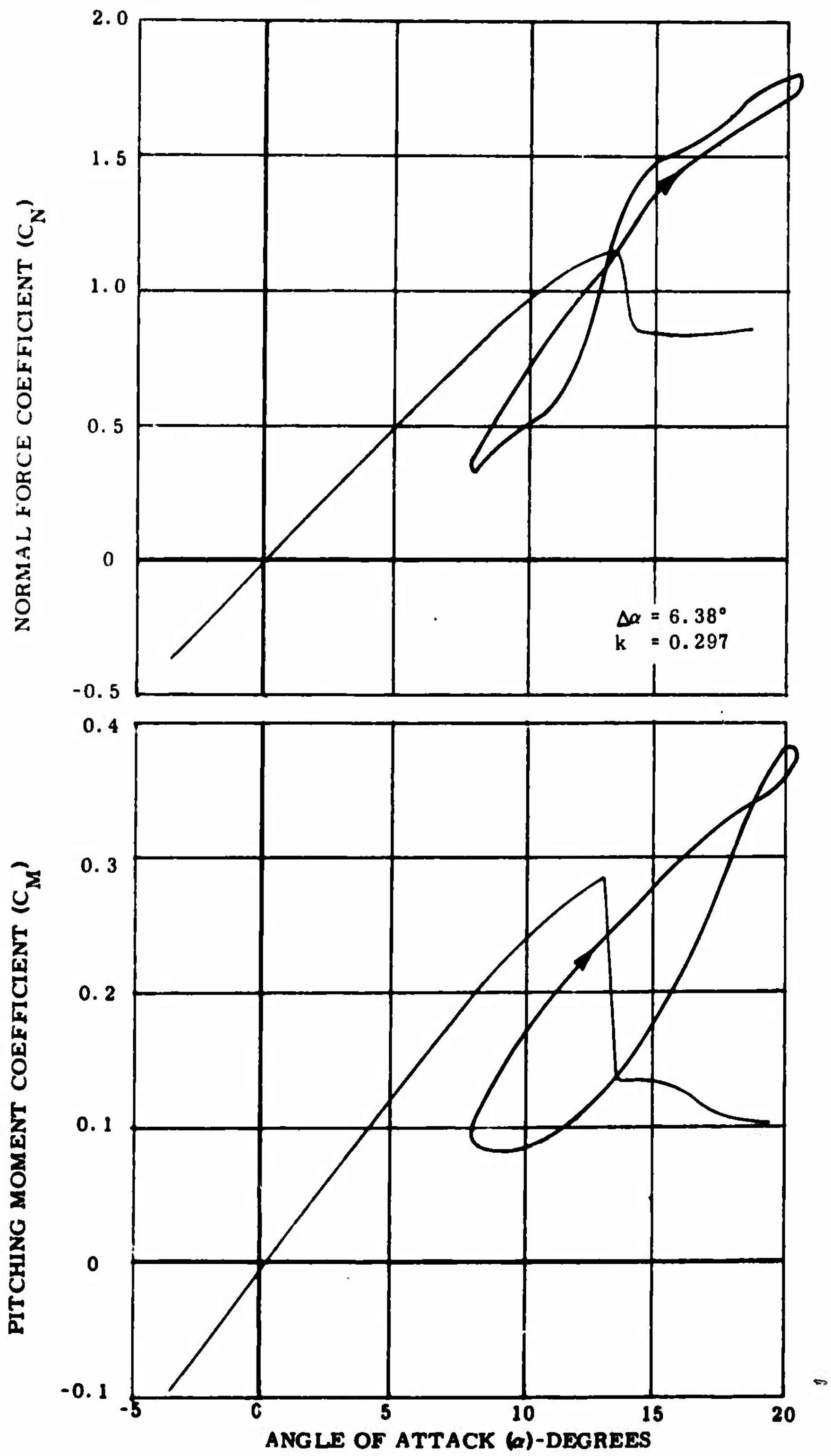

FIGURE 31. Continued

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APPENDIX I
CORRELATION OF OSCILLATING AIRFOIL DATA

In attempting to compare experimental data from various sources, two problem areas exist. The first of these is the large number of parameters involved: oscillating frequency, oscillating amplitude, test Reynolds number, airfoil profile, and pitch-axis location. The second problem area is in the type of data reported. That is, some investigators present only lift information, whereas others present only moment data. Oddly enough, early work in this country was concerned only with lift in pure pitch; whereas the British investigators measured only moments in pure pitch. A study of Table II, a tabular summary of experimental work, will point out the extent of the problems encountered in correlating or comparing experimental results.

Theoretical values of the aerodynamic coefficients provide one basis for comparison of the experimental results. Linearized theory applies to very thin wings undergoing small oscillations in an inviscid fluid. With these limitations in mind, comparison may be made between theory and low-speed investigations of airfoils oscillating about low mean angles of attack. For purposes of this report, the theory of Theodorsen[3] has been used as a guide.

Experimental work on oscillating airfoils is complicated by the difficulty in obtaining pure harmonic motions and the problems associated with measuring the forces and moments. In addition to these obstacles, calculation of tunnel wall corrections is a formidable task, so most data are presented uncorrected. The experimental difficulties coupled with the theoretical approximations result in a standard, of what is considered to be good agreement, being set rather low. Results presented in the investigations of this survey for airfoils operating at small mean angles of incidence (such that the stall angle is not exceeded) show qualitative agreement with the linearized theory.

Halfman[8] presents an excellent survey of the first six references of Table II. In order to compare the data, he had to modify them to agree in form and correct for the differences in pitch-axis location used by the various investigators. In correcting for the pitch-axis location, Halfman had to resort to theoretical considerations since there were insufficient experimental data to perform the required transfers. After applying the corrections, there was still a large difference in Reynolds number. Lift and moment data were then plotted against Reynolds number for various reduced frequencies to provide a comparison. These plots from Halfman's report have been reproduced here as Figures 32 and 33. In Figure 32 the curves labeled (S) are from the work of Reid and Vencenti[11] and Reid[12], those labeled (M) from the work of Halfman[8], and those labeled (T) from the theory of Theodorsen[3]. Considering the corrections required to

modify the data and the fact that the airfoils are slightly different profiles, Figure 32 shows remarkable agreement in the trends. In Figure 33, the curves labeled (B_1) are from the data of Bratt and Scruton[9], those labeled (B_2) from Bratt and Wight[13], those labeled (M) from Halfman[8], and those labeled (T) from theory. In the moment phase angle portion of Figure 33, it may be noted that the data of Reid and Vencenti[11] and Reid[12] show remarkable agreement, whereas those of Bratt and Scruton[9] do not agree as well. The moment magnitude data are not as consistent as the moment phase angle data. An interesting point in the moment magnitude data is that a sharp increase in magnitude with Reynolds number occurs at the higher reduced frequencies for all three sets of data presented. No explanation of this phenomenon is offered. Again, it should be borne in mind that the data from the three sources compared in Figure 33 are not for the same airfoil profiles.

In an attempt to determine the effects of airfoil profile, lift and moment data from Halfman[8] and Halfman et al[5] have been compared in Figures 34 and 35 respectively. Data presented are for four different profiles of the same thickness ratio obtained from the same test facility. Whereas qualitative agreement with theory may be noted, the scatter of the data precludes any possibility of determining the effects of airfoil profile. Along this same line, data from Wyss and Monfort[17] are presented in Figures 36 and 37. The data presented are for five airfoils with thickness and chordwise location of maximum thickness varied systematically. Although the data presented are for a Mach number 0.491, the compressibility effects should be quite small since the mean angle of incidence (2°) and the oscillating amplitude (1°) are small. Once again, there is qualitative agreement with theory but too much scatter in the data to arrive at any conclusions regarding the effects of profile.

No other attempt has been made to compare the data from the surveys listed in Table II because of the lack of conformity of the parameters involved and the fact that each investigation is compared with theory in the individual reports.

Three references (5, 6, and 9) listed in Table II present data for airfoils oscillating at high angles of attack such that the airfoil is operating in the stalled region part of the time. It may be noted from the table that the pitch-axis location is different for each investigation. Since there is no theoretical correction which can be applied to account for the different pitch-axis location for airfoils oscillating at large angles of attack, the data cannot be compared directly. While References 5 and 9 present moment data, besides the difference in pitch-axis location, they are for different airfoil shapes and different Reynolds numbers. Data presented from the investigations reported in References 5 and 6 were for the same airfoil shape. Whereas normal force is presented for instantaneous angles

of attack in Reference 6, corresponding data are not presented in Reference 5. So here again, there is no chance for direct comparison.

In addition to the tabular summary (Table II) of two-dimensional, low-speed, experimental oscillating airfoil investigations, tabular summaries are presented in Tables III-V for experimental investigations of two-dimensional oscillating airfoils in compressible flow and finite wings oscillating in low speed and compressible flow. Tables III-V are not intended to represent a complete survey. They are a summary of investigations that were brought to attention during the search for low-speed two-dimensional investigations and are included in this report for convenience. No attempt is made to correlate these summaries.

In conclusion, while there is considerable low-speed experimental data on oscillating two-dimensional airfoils, there is very little that can be directly correlated. This is due to the number of parameters involved and the choice of data recorded by the investigators. In cases where direct correlation is possible, scatter of the data restricts the possibility of any definite conclusions. Whereas qualitative agreement with linearized theory is indicated in most cases, quantitative agreement is hampered by the theoretical assumptions and the difficulty of obtaining accurate experimental data.

TABLE II. OSCILLATING AIRFOIL, SUMMARY OF

Ref. No.	Airfoil Section	Chord In.	$RN/10^6$ Range	Pitch Axis % C	$\bar{\alpha}$ Deg.	$\Delta\alpha$ Deg.	Trans. Amp. In.
9	15% Joukowski	9	.09-.28	50	0-20	2.1-10	N/A
10	18% Symmetrical	5.188	.06-.3	25	0		N/A
11	NACA 0015	15	.14-.30	40	0, -5	2.5-7.5	N/A
12	NACA 0015	10 & 15	.137-1.028	30 & 40	0-10	1-5	N/A
13	15% Joukowski, 15% EC1550, 15% Elliptical, 15% Hollow-Ground	9	.142- .283	33.3 & 50	0-18	2-6	N/A
8	NACA 0012	12	.7 - 1.0	37	0, 6.1	5.19, 6.7 & 13.5	1.0, 1.37, 2.0
5	12% Symmetrical Sharp Intermediate Blunt	12	.7 -1.0	37	0-22	6.08	0.9
14	7.3% Symmetrical	11.7	.08 -1.0	Varied	0	.95-1.9	.63
6	NACA 0012	24.5	3.0 - 6.0	25	0-33	4-8	N/A
15	NACA 0018	4	0.2-1.2	25	0	.5	N/A
36	NACA 63_2A615	8		18.75 & 32.1	9.0	.78-.96	N/A

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IARY OF LOW-SPEED EXPERIMENTAL INVESTIGATIONS

ns. o. In.	Freq. CPS	k	Instrumentation	Data Presented: Lift	N. Force	Drag	Moment	Phase Angle	Remarks
'A	0-11	0-.75	Magneto-Striction Stress Indicator				X		Virtual Mass Effect of Air is Cancelled Out of Data
'A	17	.07-.7	Spring Deflection					X	
'A	4.24 & 8.82	.2 -.95	Dynamometer	X				X	
'A	6.6-15	.2-2.0	Dynamometer	X				X	
'A	0-11	0-.785	Magneto-Striction Stress Indicator				X		
.37, 2.0	0-17	.05-.46	Strain Gage	X		X	X	X	Combined Pitch and Translation
9	2-18	.05-.55	Strain Gage	X		X	X	X	
63	4.17 & 8.33	.08-1.0	Electro-Dynamic Pickup				X	X	Combined Pitch and Translation in Rept. F. 102
'A	0-16	.06- .3	Pressure Transducers		X		X		
'A	15	.04-2.4	Piezo-Electric Gages	X			X	X	Water Tunnel
'A	18.61-19.5	.746-2.66	Strain Gage	X			X		

B

TABLE III. OSCILLATING AIRFOIL, SUMMARY OF COMPRESSIBLE FLOW I

Ref. No.	Airfoil Section	Chord In.	Mach No.	$RN/10^6$ Range	Pitch Axis % C	$\bar{\alpha}$ Deg.	$\Delta\alpha$ Deg.	Trans. Amp. In.	Freq. CPS	k	Instrumentation
16	Bi-Convex	2	0.4-0.9 1.275	.4-.8	50	0	2-4	N/A	8-27	0-.015	Photocell
17	NACA 65A012 65A008 2-008 877A008 65A004	24	.5-.9	5.0-8.0	25	0, 2	1	N/A	4-40	.025-0.45	Pressure Transducers
4	NACA 65A012 65A008 2-008 877A008 65A004	24	.2-.86	3.0-8.0	25	4-10	1	N/A	4-40	.03-1.12	Pressure Transducers
18	NACA 65A012 65A008 2-008 877A008	24	.5-.9	5.0-8.0	25	2	1	N/A	4-40	.025-0.45	Pressure Transducers
19	NACA 65-010	12	.35-.70	5.0	50	0	1.2, 2.4	N/A	0-60	0-.8	Pressure Transducers
20	NACA 65A010	12	.35-.70	5.3	50	0-16	1.2	N/A	10-35	0-.64	Pressure Transducers
21	NACA 65-010	8	.35-.78	1.0-5.5	25	0	2.3	N/A		.17-.35	Strain Gages Wattmeter
22	Blunt-Nosed Wedge	2.5	1.75-2.47	0.9	Varied	0		N/A	20	.12	Light Beams
23	Double Wedge	3	8.8	1.0	50	0	3	N/A	125	.018	Strain Gage
24	Double Wedge Single Wedge		1.37-2.43		Varied	0	1	N/A			

AIRFOIL, SUMMARY OF COMPRESSIBLE FLOW EXPERIMENTAL INVESTIGATIONS

Trans. Amp. In.	Freq. CPS	k	Instrumentation	Data Presented: Lift	N. Force	Drag	Moment	Phase Angle	Damping	Remarks
N/A	8-27	0-.015	Photocell						X	Measured Model Displacement
N/A	4-40	.025-0.45	Pressure Transducers	X			X	X		
N/A	4-40	.03-1.12	Pressure Transducers	X			X	X		
N/A	4-40	.025-0.45	Pressure Transducers	X			X	X		Effect of Spoilers on Oscillating Airfoils
N/A	0-60	0-.8	Pressure Transducers	X			X	X		
N/A	10-35	0-.64	Pressure Transducers		X		X	X		
N/A		.17-.35	Strain Gages Wattmeter	X			X	X		
N/A	20	.12	Light Beams						X	Measured Model Displacement
N/A	125	.018	Strain Gage							
N/A						X				

B

TABLE IV. OSCILLATING WING, SUMMARY OF LOW-SPE

Ref. No.	Airfoil Section	Chord In.	AR	TR	$\bar{c}/4$	Span Semi	Span Full	RN/10^6 Range	Pitch Axis % C	$\bar{a}$ Deg.	Δa Deg.	Trans Amp. I
25	15% Thick		10	1.0	0			0.9	50			
			6	1.0	0							
			4	1.0	0							
			2	1.0	0							
			1	1.0	0							
9	15% Joukow-ski	9	2.7	1.0	0		24.3	.19-.08	50	0, 6	5-10	N/A
13	15% Joukow-ski, EC 1550	9	1.0	1.0	0		9	.14-.28	50	0, 8, 10	6	N/A
			2.0	1.0	0		18					
			3.0	1.0	0		27					
			3.5	1.0	0		31.5					
			4.4	1.0	0		39.6					
26	NACA 0020	3.75	3	1.0	0		11.25	.1-.35	N/A	N/A	N/A	0.8
		3.75	4	1.0	0		15.0					
		3.75	5	1.0	0		18.75					
		3.75	3	1.0	45		11.25					
		3.75	5	1.0	45		18.75					
27	8% Gothic		.75						30, 45	0-20		N/A
	5% Gothic		.75						60			
28	RAE 102		1.2	14			28.8	.75-1.5	.754* .973*	0-15	.9-4.4	N/A
	RAE 102	24	1.6	0			33.6	1.2	.862*	0-15	2-4.7	
	RAE 102	21	1.32	46			38.5	1.7	1.112* .883*	0-15	1.15-5.15	
	RAE 102, 10%	13.4	2.97	.14	36.9		40.2	.7-2.2	.328* .055*	0	1.65	1.0-2.0
	RAE 101, 6%	21.3	3.0	1.0	60		64		.288*	0	1.70	
	EQ 10, 40, 10%	20.7	4.4	.31	40		97.5		.258* .572*	0	1.70	
30	RAE 101	20	3.3	1.0	0	33.5		.4-1.5	0 100	0	2.0	N/A

MEASURED FROM WING APEX

ING, SUMMARY OF LOW-SPEED EXPERIMENTAL INVESTIGATIONS

Axis	$\bar{a}$ Deg.	Δa Deg.	Trans. Amp. In.	Freq. CPS	k	Instru-mentation	Data Presented: Lift	Moment	Phase Angle	Damping	Remarks
					0.35		X	X	X		Pitch and Heave
	0, 6	5-10	N/A	0-10.3	0-.506	Magneto Striction Stress Indicator		X			
	0, 8, 10	6	N/A	0-11	0-.78	Magneto Striction Stress Indicator			X		
	N/A	N/A	0.8		.025-.25	Light Beam				X	Measured Model Displacement
	0-20		N/A		0-.7		X	X			
	0-15	.9-4.4	N/A		.03-.375	Light Beams	X			X	Clipped Delta Wing 6%, Delta Wing 6%
	0-15	2-4.7			.03-.375						
	0-15	1.15-5.15			.03-.375						Arrowhead wing 10%
	0	1.65	1.0-2.0	0-2.97	0-.08	Strain Gages	X	X		X	Only 90° Delta Wing Heaved
	0	1.70		0-2.97	0-.13						
	0	1.70		0-2.97	0-.13						Measurements Made Using Free and Forced Oscillations
	0	2.0	N/A		.2-.65	Force Transducer					

B

TABLE V. OSCILLATING WING, SUMMARY OF CO

Ref. No.	Airfoil Section	Wing Characteristics: Chord In.	AR	TR	c/4 Deg.	Semi-Span In.	Mach No.	$RN/10^6$ Range	Pitch Axis % C	$\bar{a}$ Deg.	Δa Deg.	Trans Amp. I
31	NACA 16-004	5	5.4	1.0	0	13.5	.042-.794	.049-5.34	25	0-24	3	N/A
		5.35	5.04	1.0	15	13.5			32.5			
		5.78	4.05	1.0	30	11.7			50			
		7.07	2.7	1.0	45	9.53			75			
	NACA 65A004	8	6.0	1.0	0	24						
		8	5.25	1.0	0	21						
		8	4.5	1.0	0	18						
		8	3.75	1.0	0	15						
32	NACA 65A010	12	2	1.0	0	12	.18-.75	.9-9.5	50	0		N/A
33	NACA 65A010	12	2	1.0	0	12	.15-.81	.6-9.21	50	0	1.24-2.11	N/A
34	NACA 65A005	40	3	0.5	0	45	.4-1.07	6-10.2	50	0-10	1.5	N/A
35	5% Bi-convex Delta Wings	5.11	3	.07	49.1*	7.71	1.2-2.0	4.0	76.9** 44.5**	0	.8-1.6	N/A
		5.85	2	.07	60.0*	5.89			76.8** 49.3**			
		6.87	1.25	.07	70.1*	4.30			72.7** 49.3**			
	5% Bi-convex Swept Wings	5.30	3	.238	49.1*	7.99			86.4** 51.3**			
		6.05	2	.238	60.0*	6.09			82.7** 52.0**			
		7.07	1.25	.238	70.1*	4.42			81.7** 55.4**			

L. E. SWEEP
% ROOT CHORD

IMARY OF COMPRESSIBLE FLOW EXPERIMENTAL INVESTIGATIONS

$\Delta\alpha$ Deg.	Trans. Amp. In.	Freq. CPS	k	Instrumentation	Data Presented: Lift	Moment	Phase Angle	Damping	Remarks
3	N/A	35-175	.15-1.3	Strain Gages				X	Flutter Tests
	N/A		.05-.657	Strain Gages	X	X	X		Wing With Tip Tank
1.24-2.11	N/A	31-62	.15-1.32	Strain Gages	X	X	X		
1.5	N/A	12.5	.008-.269	Pressure Trans.	X	X	X		
.8-1.6	N/A	35-70	.054-.187	Dampometer			X		

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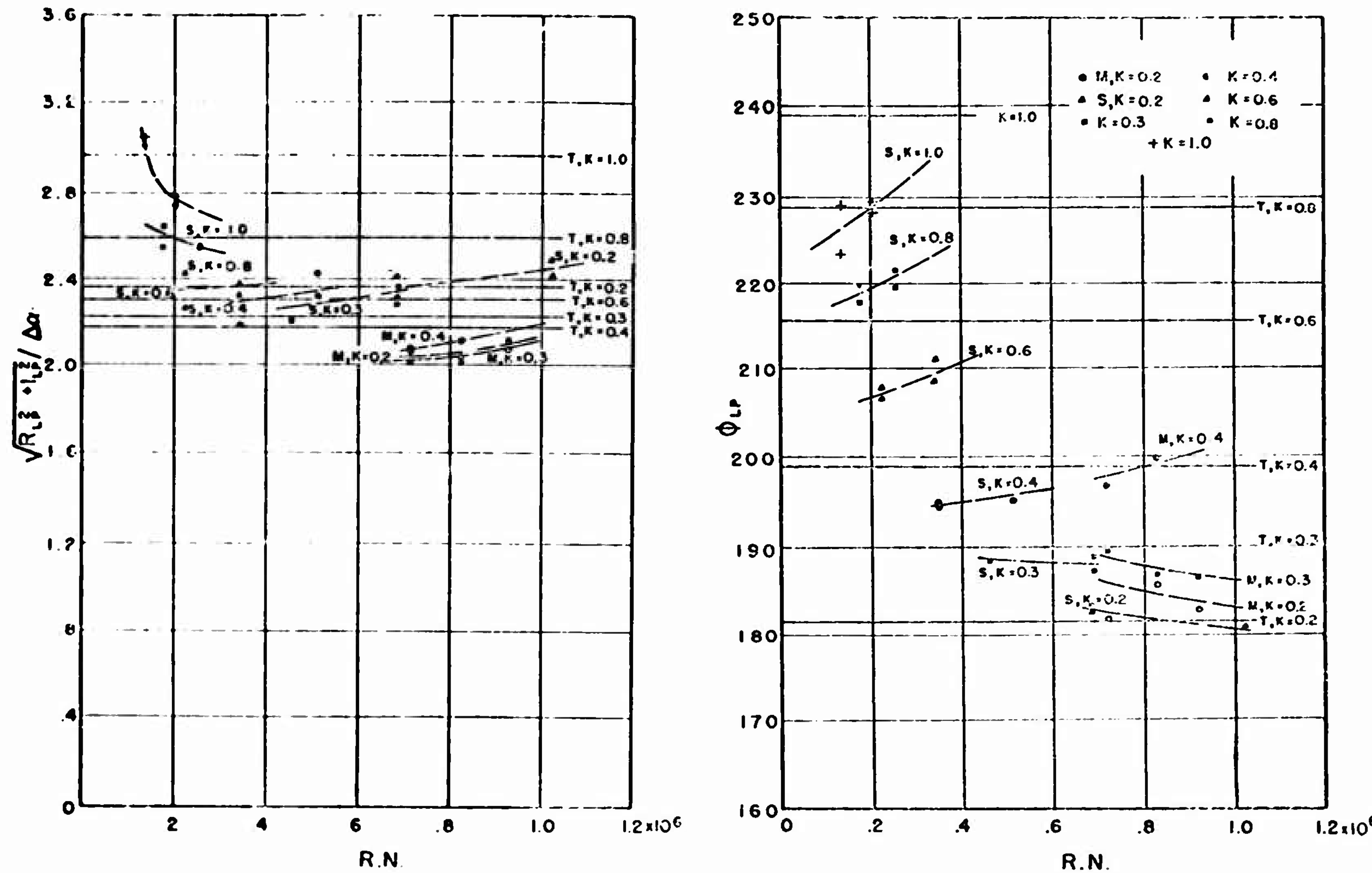

FIGURE 32. Reynolds Number Effect - Lift in Pure Pitch.

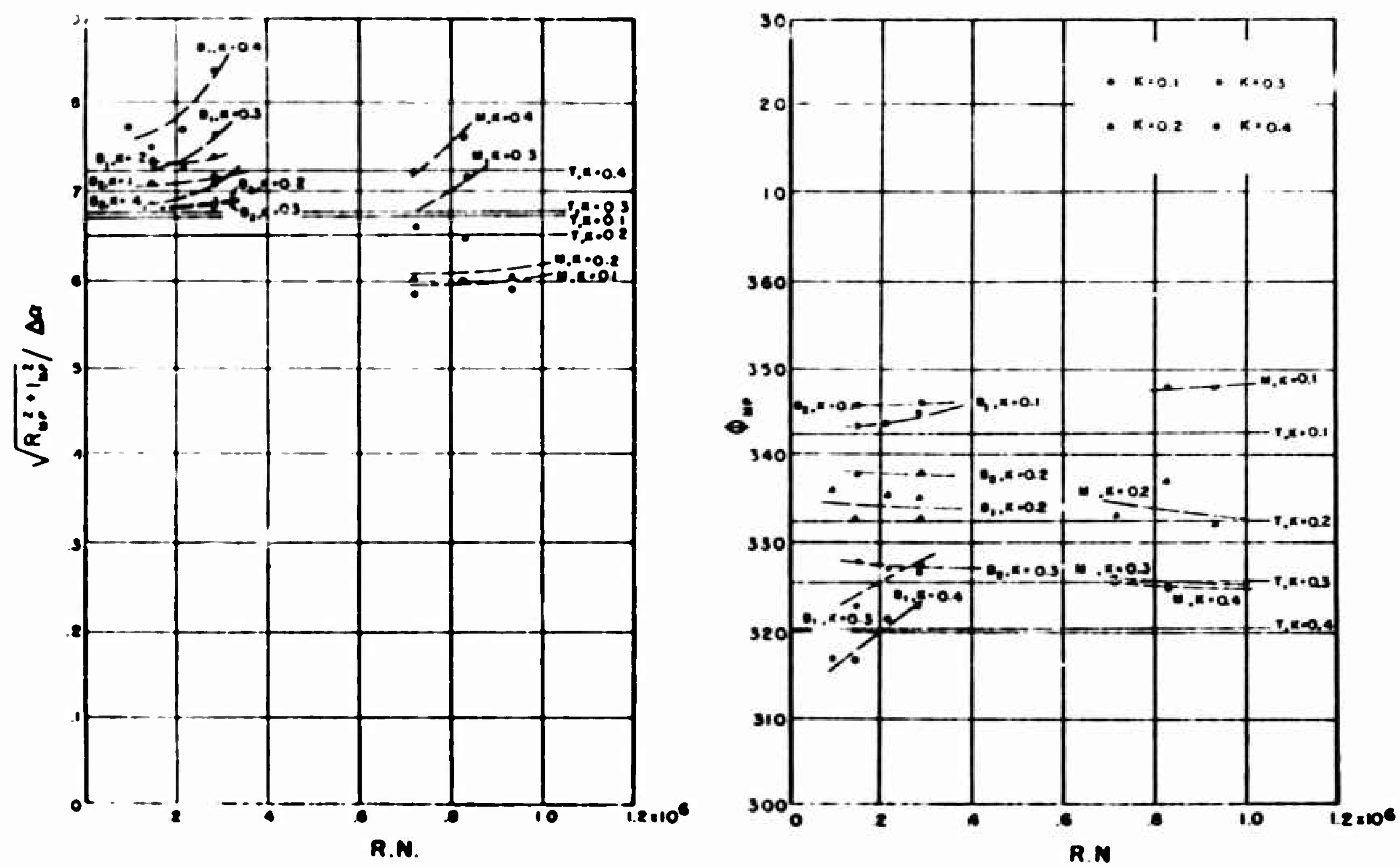

FIGURE 33. Reynolds Number Effect - Moment in Pure Pitch.

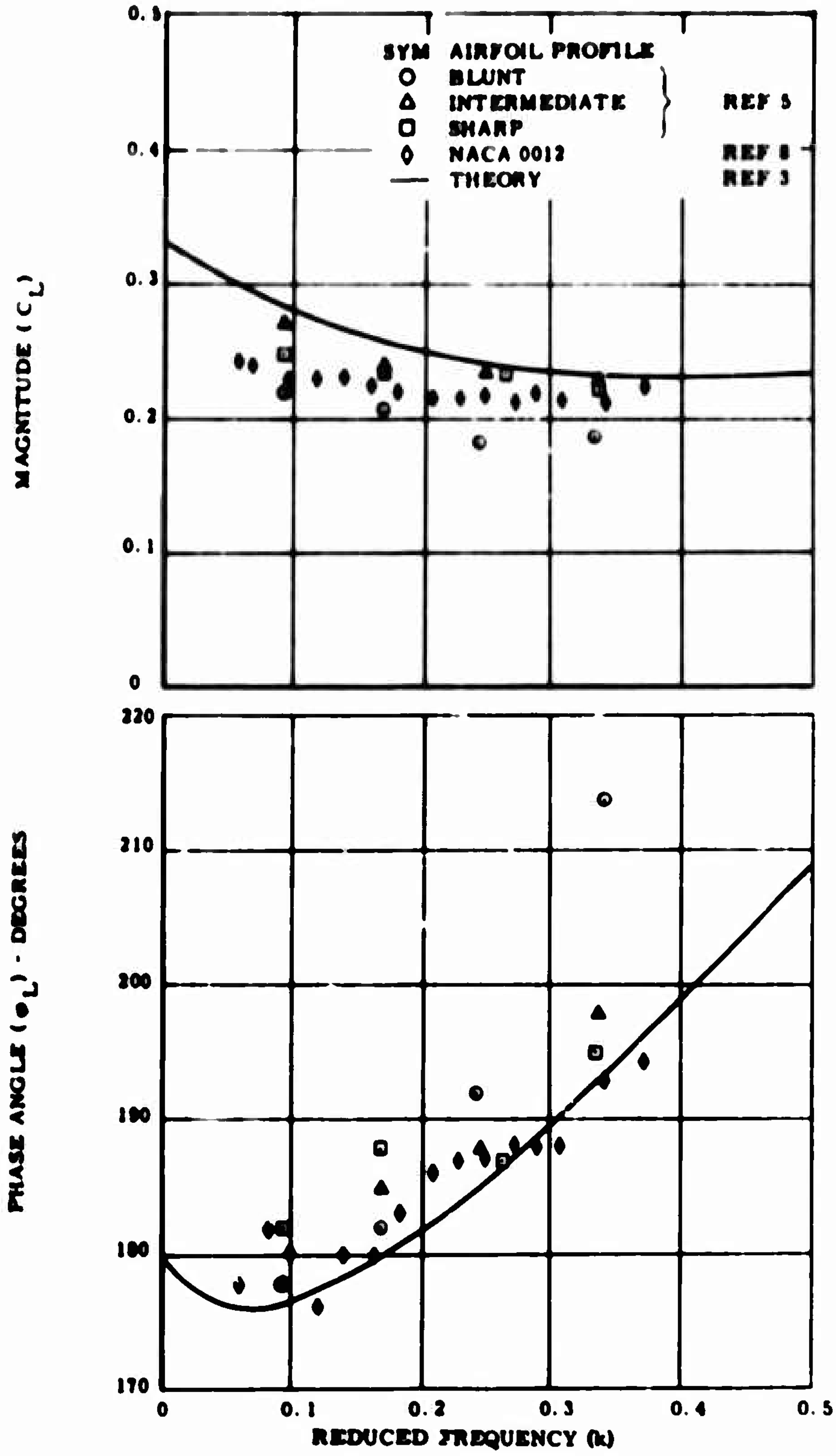

FIGURE 34. Airfoil Profile Effect - Lift in Pure Pitch, $\bar{\alpha}$ = 0°, $\Delta\alpha$ = 6.08°, Pitch Axis = 37% Chord.

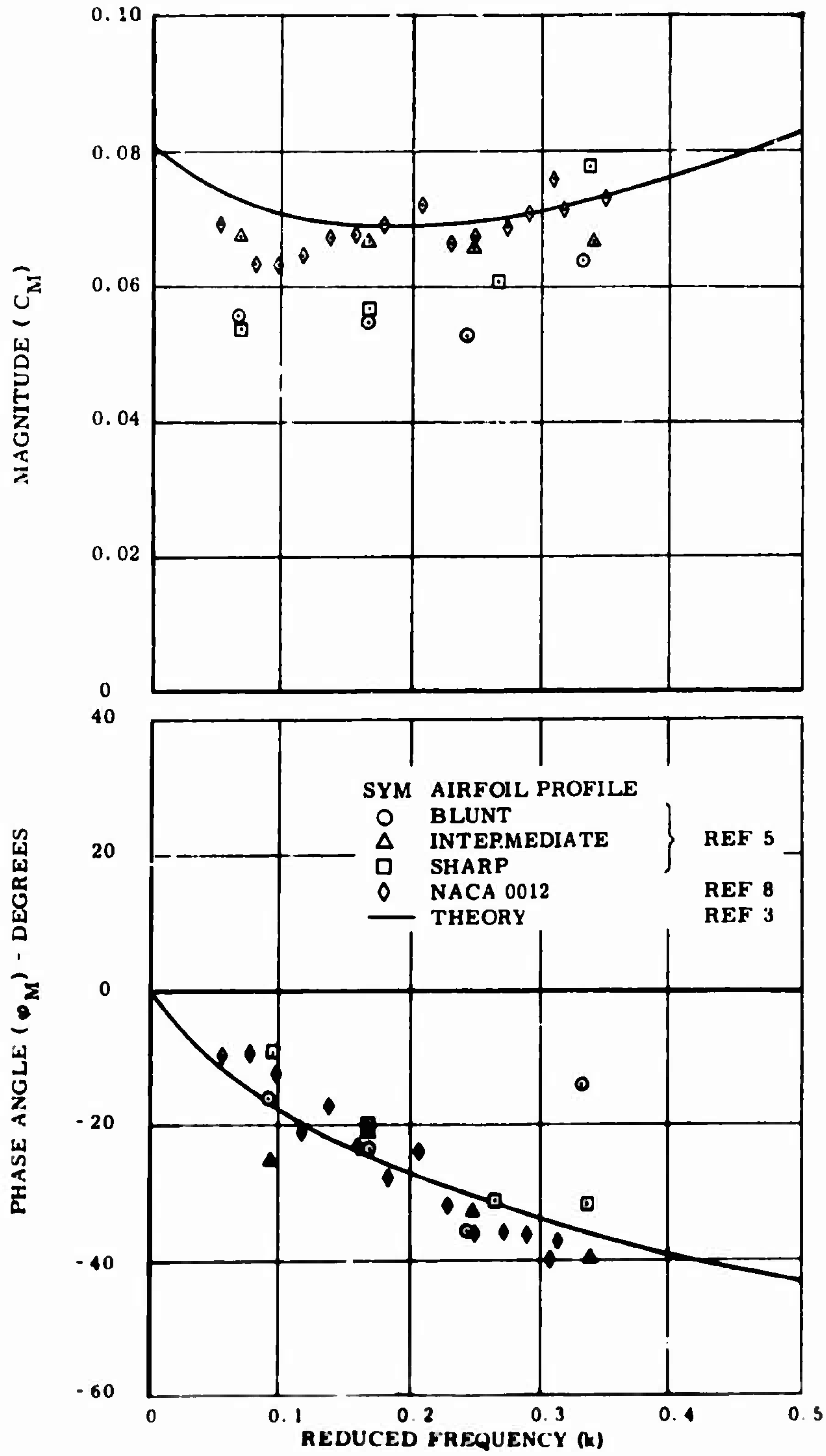

FIGURE 35. Airfoil Profile Effect - Moment in Pure Pitch, $\bar{\alpha} = 0°$, $\Delta\alpha = 6.08°$, Pitch Axis = 37% Chord.

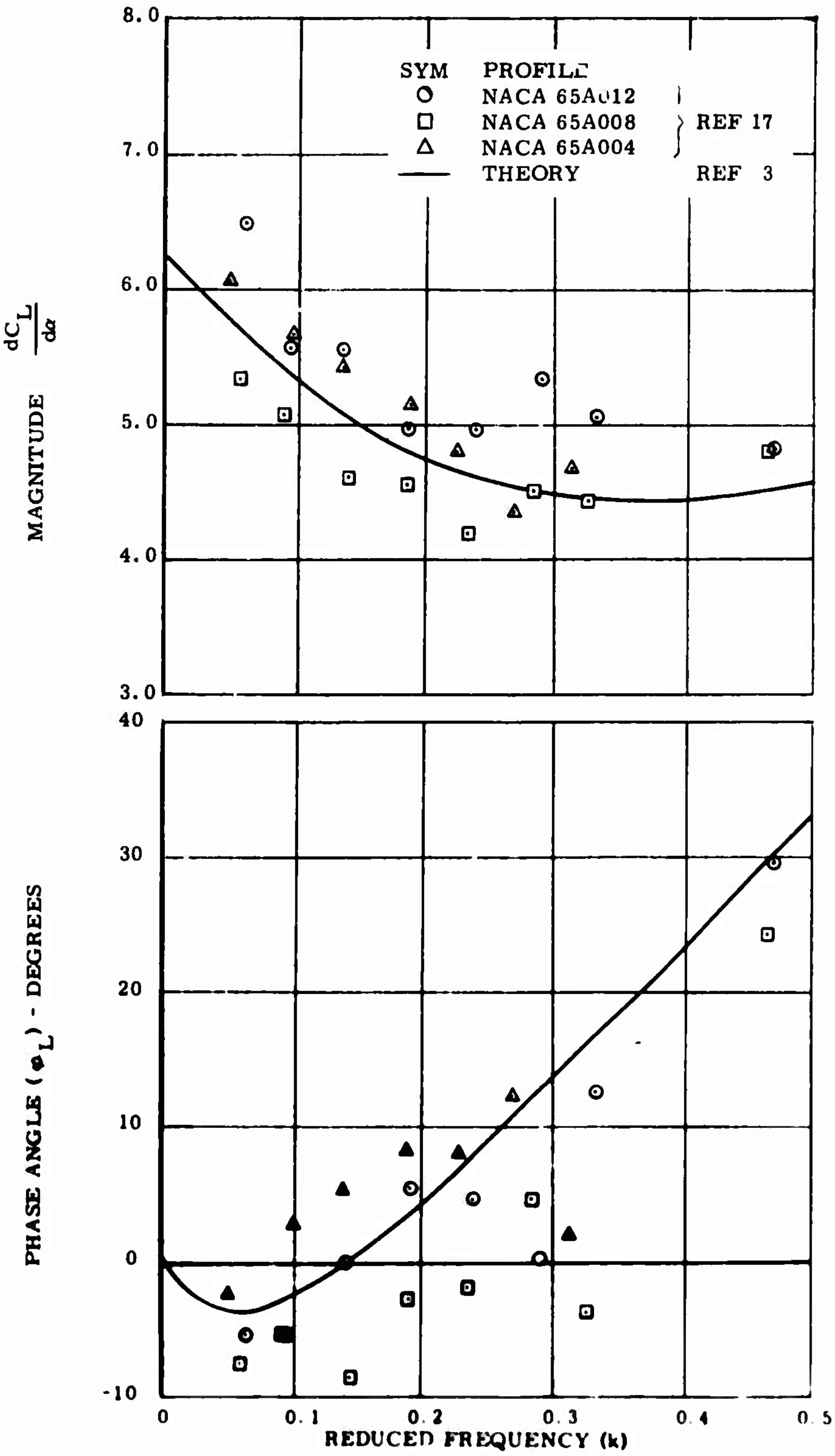

FIGURE 36. Effect of Airfoil Thickness - Lift in Pure Pitch, M = .491, $\bar{\alpha}$ = 2°, Pitch Axis = 25% Chord.

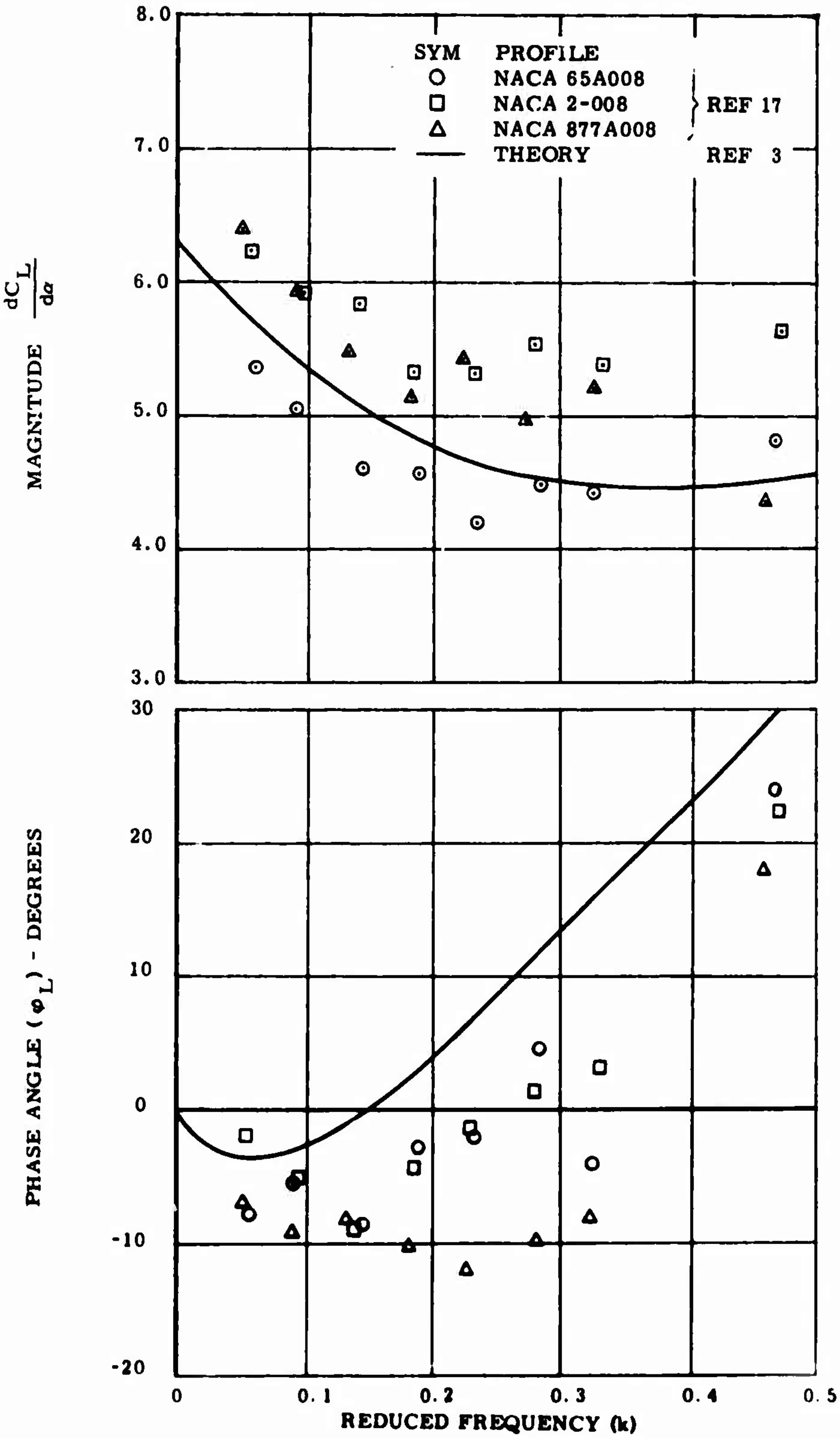

FIGURE 37. Effect of Thickness Distribution - Lift in Pure Pitch, M = .491, $\bar{\alpha}$ = 2°, Pitch Axis = 25% Chord.

APPENDIX II
EFFECT OF TUBING ON THE REMOTE READING OF OSCILLATING PRESSURES*

INTRODUCTION

In order to support the investigation of the pressure distribution over an oscillating airfoil, it is desirable to have a knowledge of the effect of tubing size and diameter upon the response of a remotely located transducer at various frequencies of airfoil oscillation. There are two aspects to the response -- attenuation of the pressure and pressure lag. For this investigation, the term pressure attenuation is defined as the ratio of the remote pressure to the local or reference pressure.

It was hoped that, in order to keep the amount of recording equipment to a minimum, lengths of tubing could be led from the pressure orifices on the wind-tunnel model to a scanivalve and single transducer located outside the wind tunnel.

During the course of the investigation, it was decided that it would be useful to have an idea of the error encountered when transducers are mounted inside the model and connected to the orifices by short lengths of tubing.

EXPERIMENTAL APPARATUS AND PROCEDURE

The apparatus consisted of a sinusoidally oscillating piston which was driven by a Scotch-yoke mechanism. Two differential pressure transducers (Statham Model No. PM 131TC ±2.5-350) were used, one whose diaphragm was mounted flush with the end of the piston cylinder and another that was connected to the cylinder through lengths of flexible tubing. The signals of both pressure transducers were first fed into a multichannel carrier amplifier and thence into a recording oscillograph. Calibration of the recording system was accomplished by comparing readings from a water-filled manometer with stepped oscillograph traces.

The experimental investigation consisted of three phases. The first phase examined the effects of tubing length and oscillation frequency -- the remote transducer being mounted in a scanivalve. The second phase examined the effects of tubing length and frequency of oscillation amplitude - the remote transducer being mounted in a special holder. The third phase examined the effects of tube diameter, frequency of oscillation, oscillation

*Dagold, Reuben G., RESEARCH MEMORANDUM 1967-4, Wind Tunnel Operations Department, University of Maryland, College Park, Maryland, 1967.

amplitude, and tubing connection position (i. e., to the flush diaphragm face of the transducer and to the plug side of the diaphragm) with a short length of tubing -- the remote transducer again being mounted in the special holder.

The repeatability of the data between runs using the scanivalve (first phase) was poor (see Figures 38 and 39). A very flexible rubber gasket is used to seal the inlet tubes of the scanivalve. The gasket can partially restrict the opening; the extent of the restriction changes each time that the seal is tightened and also varies from port to port. Thus, it was surmised that the poor repeatability might be attributed to the scanivalve design.

A special holder was made that avoided the varying restriction problem of the scanivalve. Use of the holder during the second phase produced good repeatability of data (see Figures 40 and 41).

The entire investigation was conducted at a mean pressure level of one atmosphere, that being the pressure in the cylinder where the piston is at midstroke. It was at that piston position and pressure that phase-lag data were obtained. The phase lag is defined here as the amount, in degrees, that the remotely read pressure lags the pressure recorded in the cylinder. By amplitude, one-half the difference between the maximum and minimum pressures is meant.

DISCUSSION OF RESULTS

It was noted that phase lag varies during a cycle and that although the piston motion was sinusoidal, the pressure did not vary sinusoidally. Figure 42 provides an example of lag variation over the cycle (the curves have been normalized). It is evident here that, for the remote pressure reading, the time for the pressure to decrease from the maximum to the minimum is greater than the time for the pressure to increase from the minimum to the maximum. This is substantiated by Larcombe and Peto[37], who state that for a constant absolute value of difference between the initial pressure in the tube and the applied pressure, a pressure drop leads to a longer response time than the corresponding pressure rise - because the equilibrium process takes a longer time near the lower final pressure. Thus, the plots presenting phase lag show two points per run per frequency as an indication of the range of variation. Both points were obtained at the piston midstroke position (or zero normalized pressure in Figure 42) -- one 180 degrees from the other.

Figure 43 presents a sample readout from the flush-mounted piston transducer and illustrates the fact that the pressure did not vary sinusoidally. By assuming Boyles's Law to be valid here, it can be shown that the non-sinusoidal variation is to be expected:

$$pV = p_0 V_0$$

where p = pressure
V = volume
subcript $_0$ denotes condition at piston midstroke

The volume at any instant can be expressed in terms of the angular position of the crank θ,

$$V = V_0 + \Delta V \sin\theta$$
$$= V_0 (1 + V' \sin\theta)$$

where $V' = \Delta V / V_0$
Substituting this value of V into the original equation,

$$p = p_0 / (1 + V' \sin\theta)$$

Expanding and neglecting higher order terms of V', the expression can be written

$$p - p_0 = - p_0 V' \sin\theta (1 - V' \sin\theta)$$

Note that as V' becomes small, $p - p_0$ approaches $- p_0 V' \sin\theta$. However, for this investigation, V' was not small.

A report of some interest is that of Bergh and Tijdeman[38], wherein are presented results of theoretical and experimental investigations of the relationship between the sinusoidal pressure disturbance in a given volume and an adjoining volume. However, the theoretical approach employed very small sinusoidal disturbances. The present investigation employed disturbances of an order of magnitude greater, more realistically simulating the disturbances in the wind tunnel.

Examining Figures 38 through 41, the following trends are noted:

1. The pressure attenuation peaks (first resonance peak) occur at lower frequencies as the tube length is increased, and the peak values decrease with increasing tube length.

2. The phase lag increases with increasing tube length and with increasing frequency.

3. The amplitude of the oscillating pressure has a significant effect upon pressure attenuation and phase lag -- the effect being more pronounced with the greater tube length.

In addition to trends (1) and (2) stated above, Bergh and Tijdeman indicate that pressure attenuation and phase lag are functions of pressure level. Pressure level was not varied during this investigation. Trend (3), however, is not noted by them, probably due to the small magnitude of pressure disturbuance that they imposed.

The results of the short (6-inch) tubing investigation are presented in Figures 44 and 45. It is immediately obvious that connecting to the plug side of the transducer produces greater phase lag and greater deviation of attenuation from 1.00, probably because of the larger volume between the tubing and the diaphragm. Within the frequency range (up to 32 cycles per second), mean amplitudes (61 and 31 inches of water), and tube diameters (.049 and .094 inch) tested, phase lag and attenuation appear to be nearly independent of amplitude and diameter for the flush diaphragm face connection. The pressure attenuation varied from 1.00 to 1.02 nearly linearly with increasing frequency, and the remote pressure lagged the actual pressure by an amount that varied from 0 to 2-1/2 degrees nearly linearly with increasing frequency. Also,the phase lag showed only a slight variation over a cycle.

CONCLUSIONS

Since the scanivalve gasket restriction of the ports has a strong effect upon the data, the use of the scanivalve and single transducer is in all likelihood precluded.

In addition to being functions of tube geometry and frequency of oscillation, pressure attenuation and phase lag are also functions of pressure level, amplitude of pressure oscillation, and portion of cycle. Therefore, it would be a very difficult task to determine the instantaneous local oscillating pressure from remote readings.

For the above reasons, it is highly unlikely that a scanivalve and/or transducers mounted outside the wind tunnel can be employed. It would be necessary to mount transducers inside the model, where there would still be need for short tubing to connect some of the orifices. This connecting tubing should be kept as short as possible and should not exceed the 6-inch length tested. By directly using the remotely read data of the short tubing, the ensuing errors would be within acceptable bounds. The error level could be reduced by assuming an average or constant lag throughout the cycle, shifting the oscillating pressure curve the appropriate amount, and applying an attenuation factor (which would be the reciprocal of the attenuation).

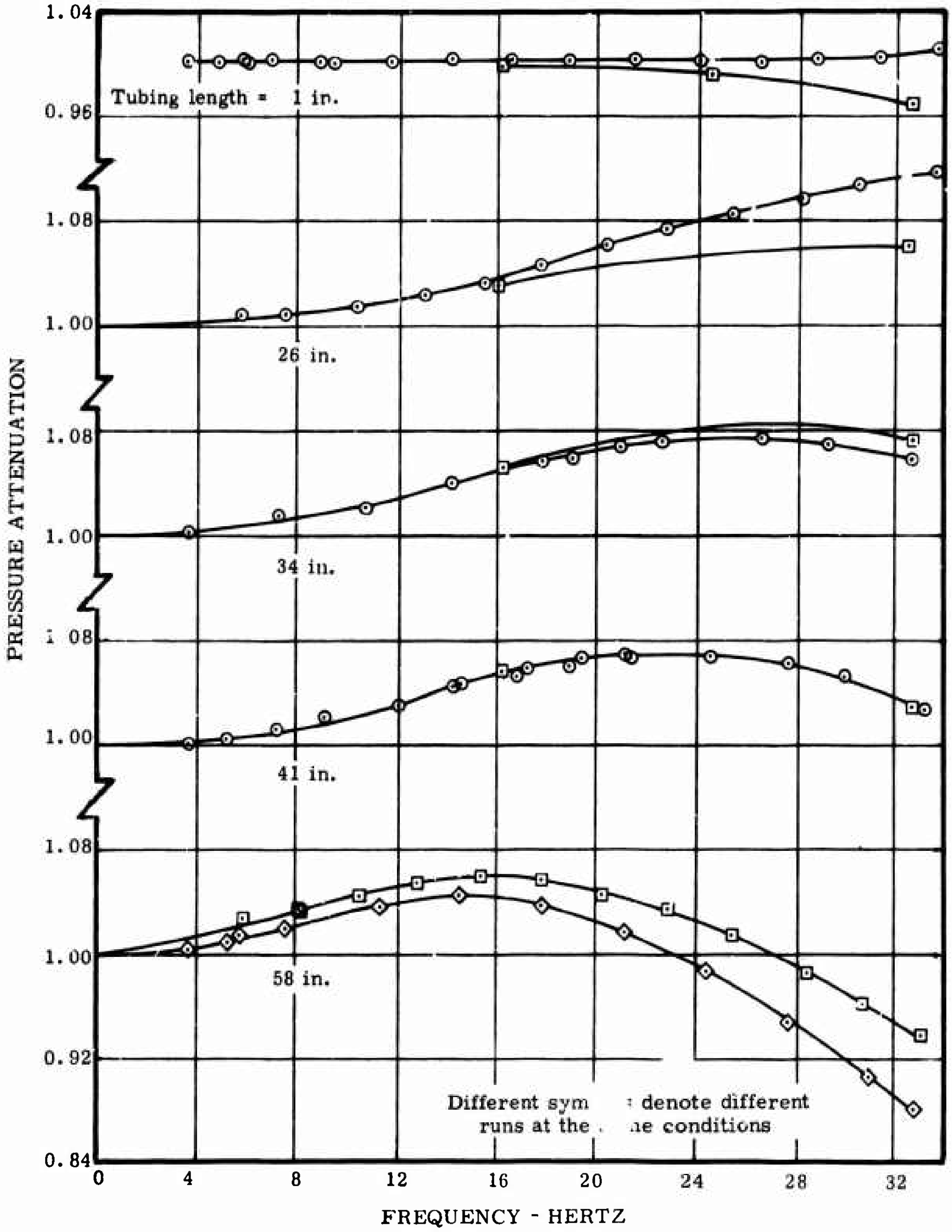

FIGURE 38. Pressure Attenuation, Influence of Tube Length, Using Scanivalve, Mean Pressure Amplitude 61 in. H_2O, Tube Diameter 0.049 in.

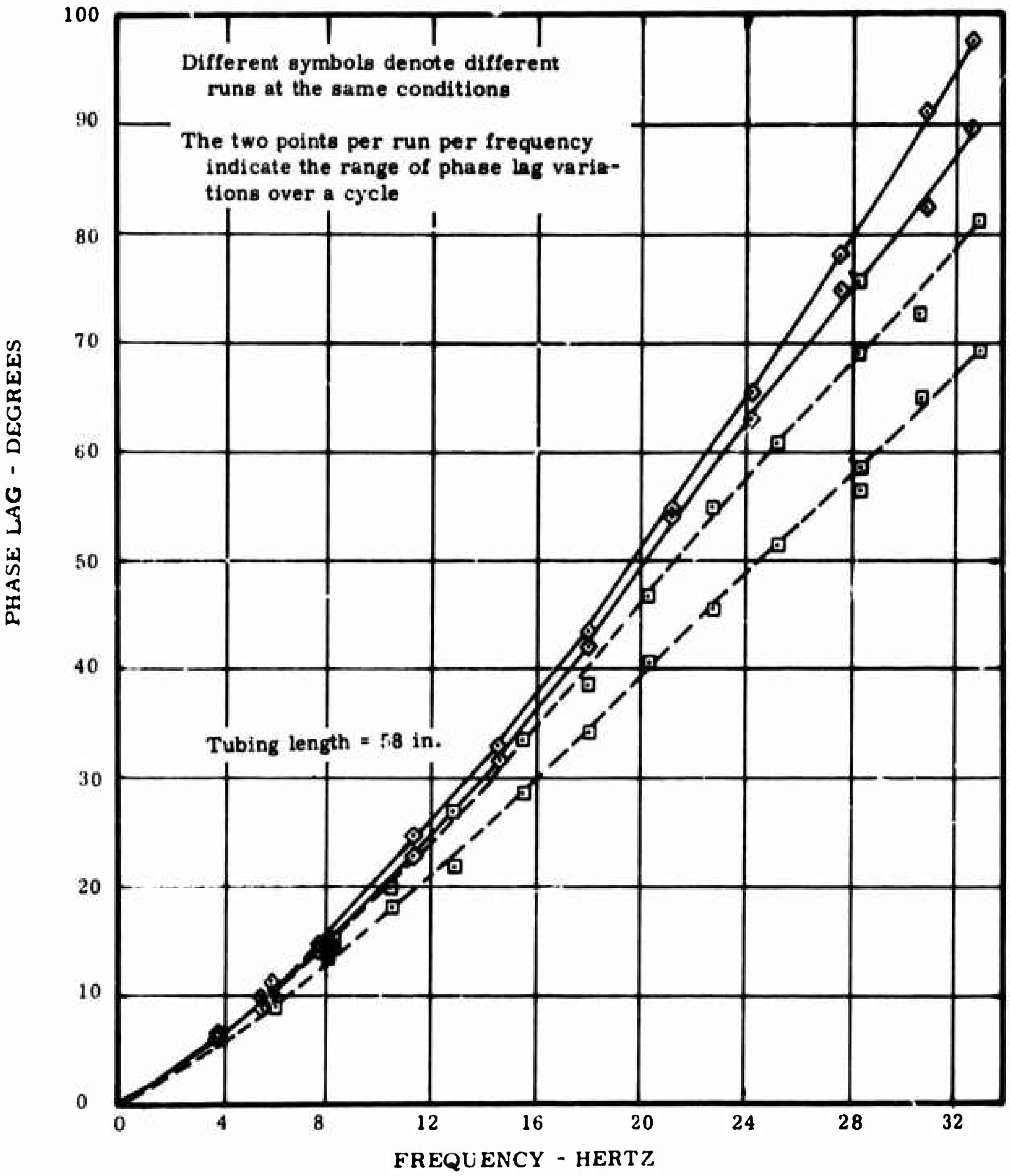

FIGURE 39. Phase Lag, Influence of Tube Length, Using Scanivalve, Mean Pressure Amplitude 61 in. H_20, Tube Diameter 0.049 in.

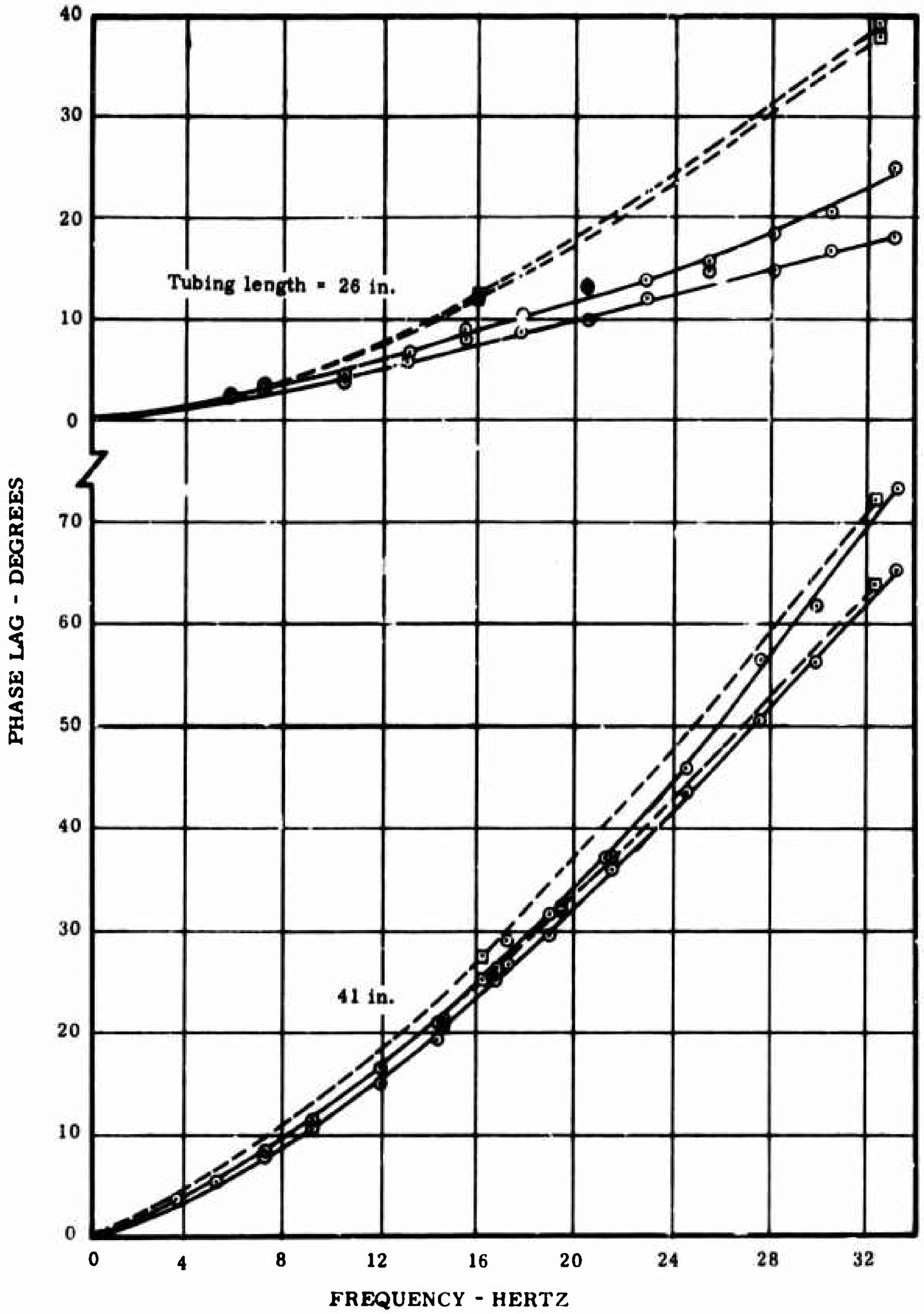

FIGURE 39. Continued.

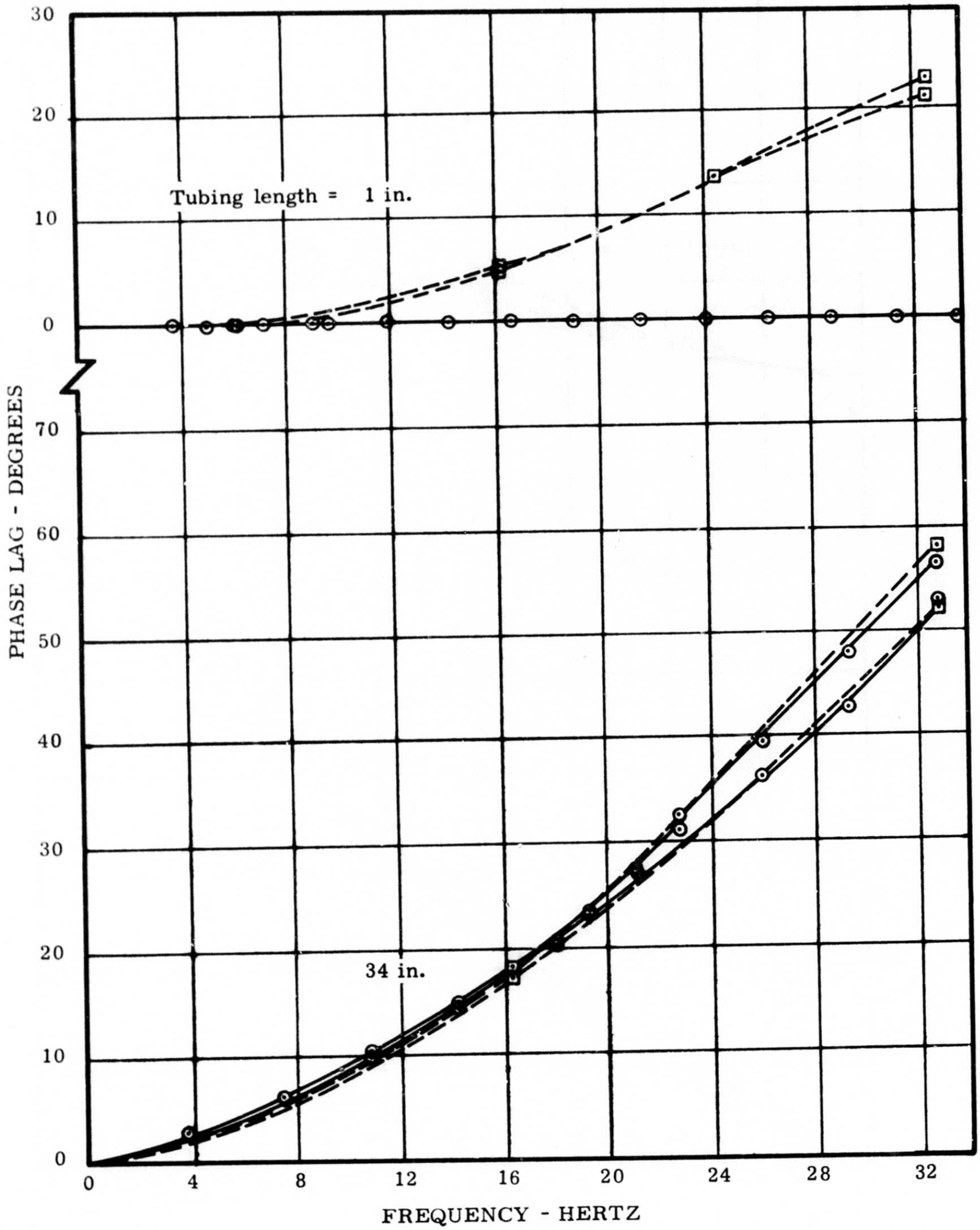

FIGURE 39. Continued.

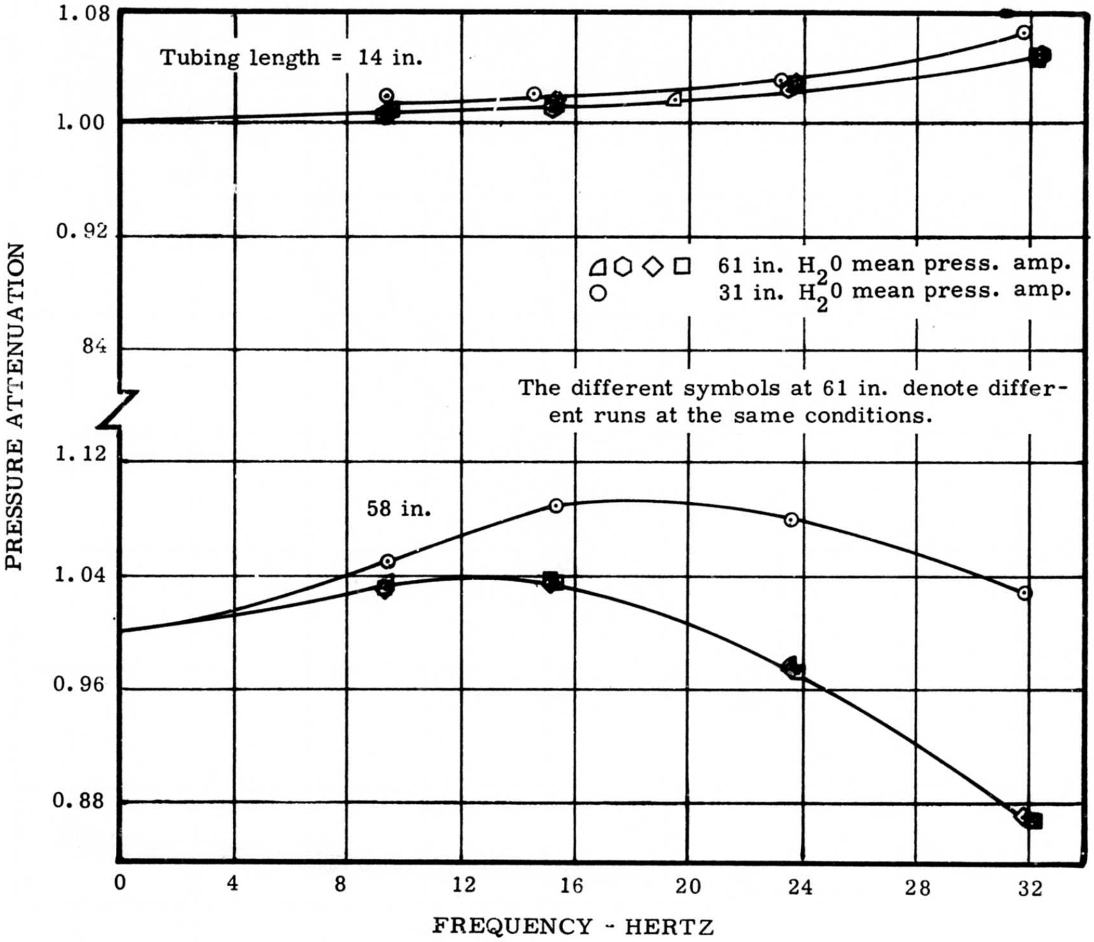

FIGURE 40. Pressure Attenuation, Influence of Tube Length and Pressure Amplitude, Tube Diameter 0.049 in.

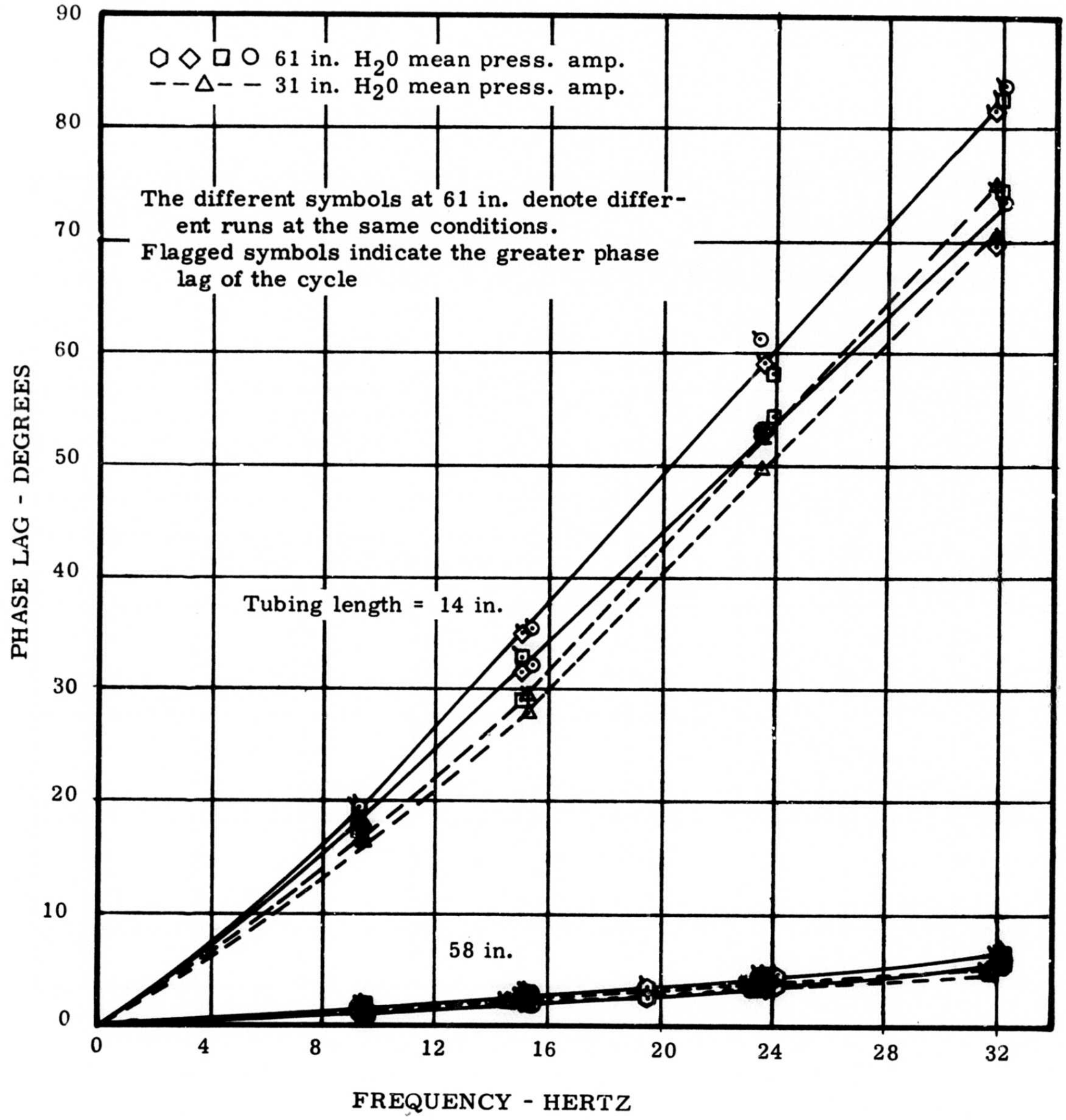

FIGURE 41. Phase Lag, Influence of Tube Length and Pressure Amplitude, Tube Diameter 0.049 in.

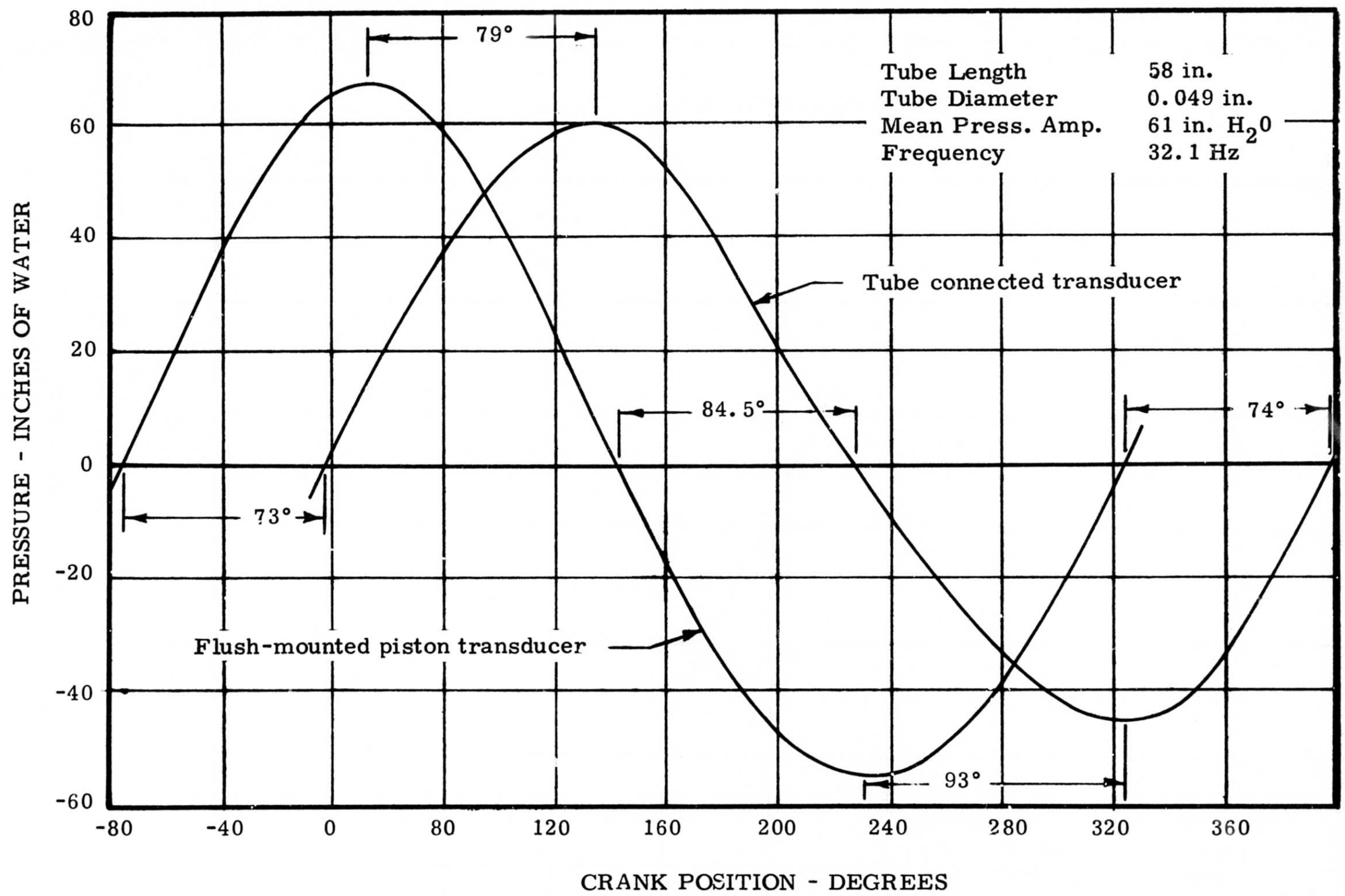

FIGURE 42. Variation of Phase Lag Over Cycle.

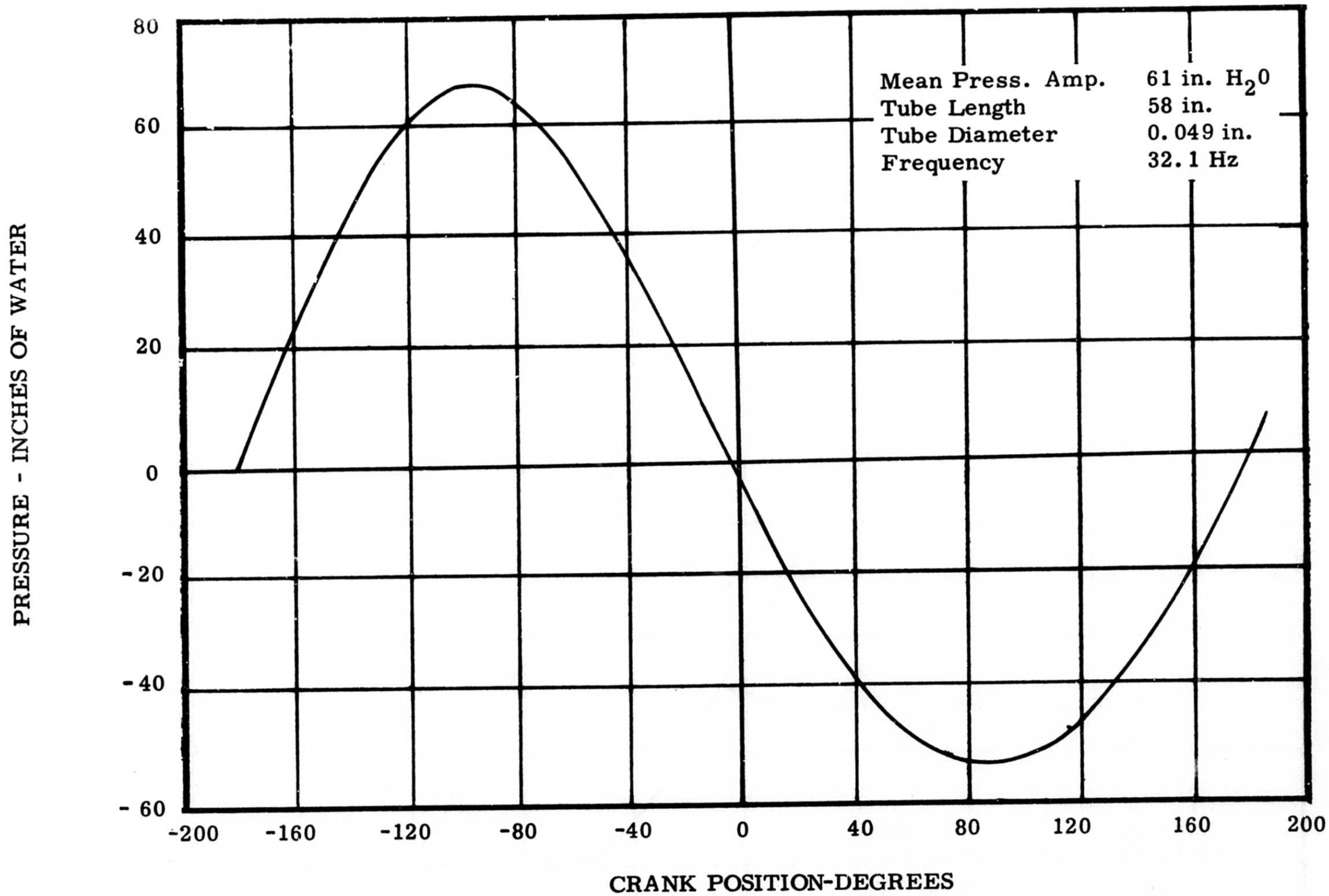

FIGURE 43. Sample of Actual Pressure Versus Crank Position, Flush-Mounted Piston Transducer.

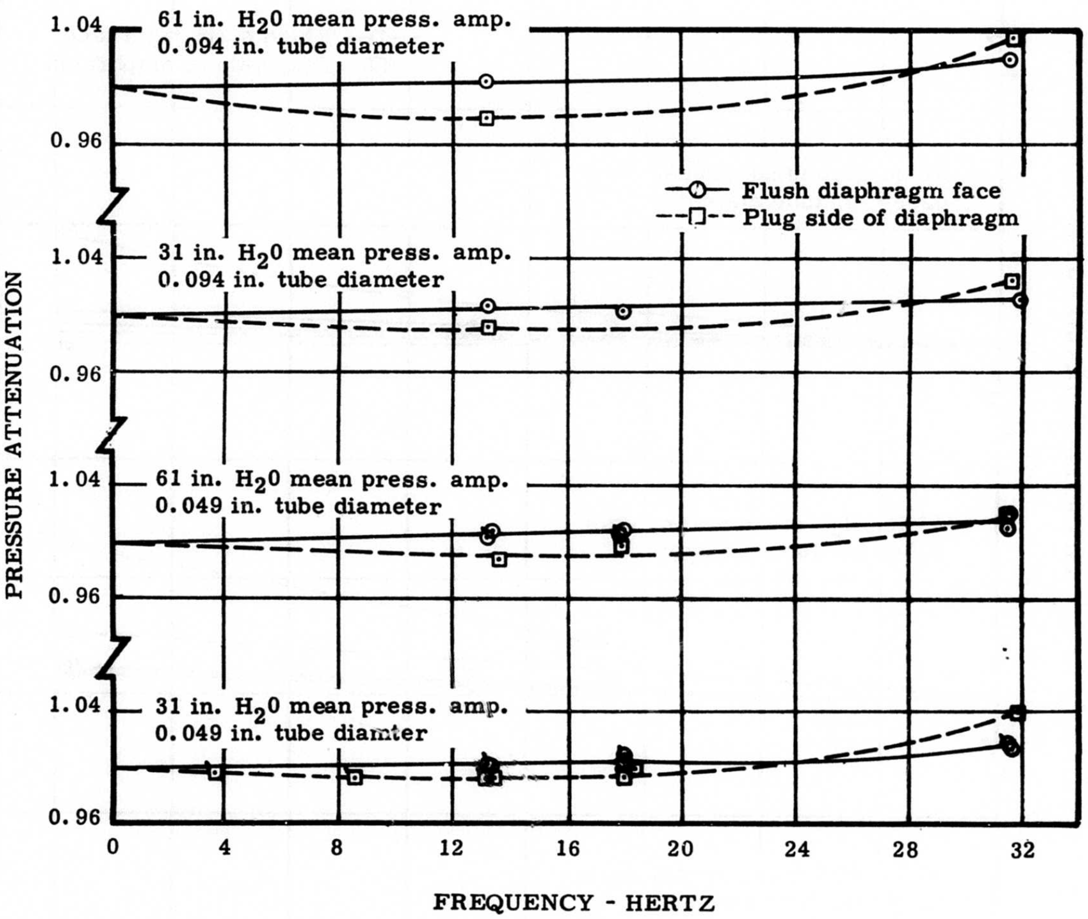

FIGURE 44. Pressure Attenuation, Short Tubing Length (6 in.)

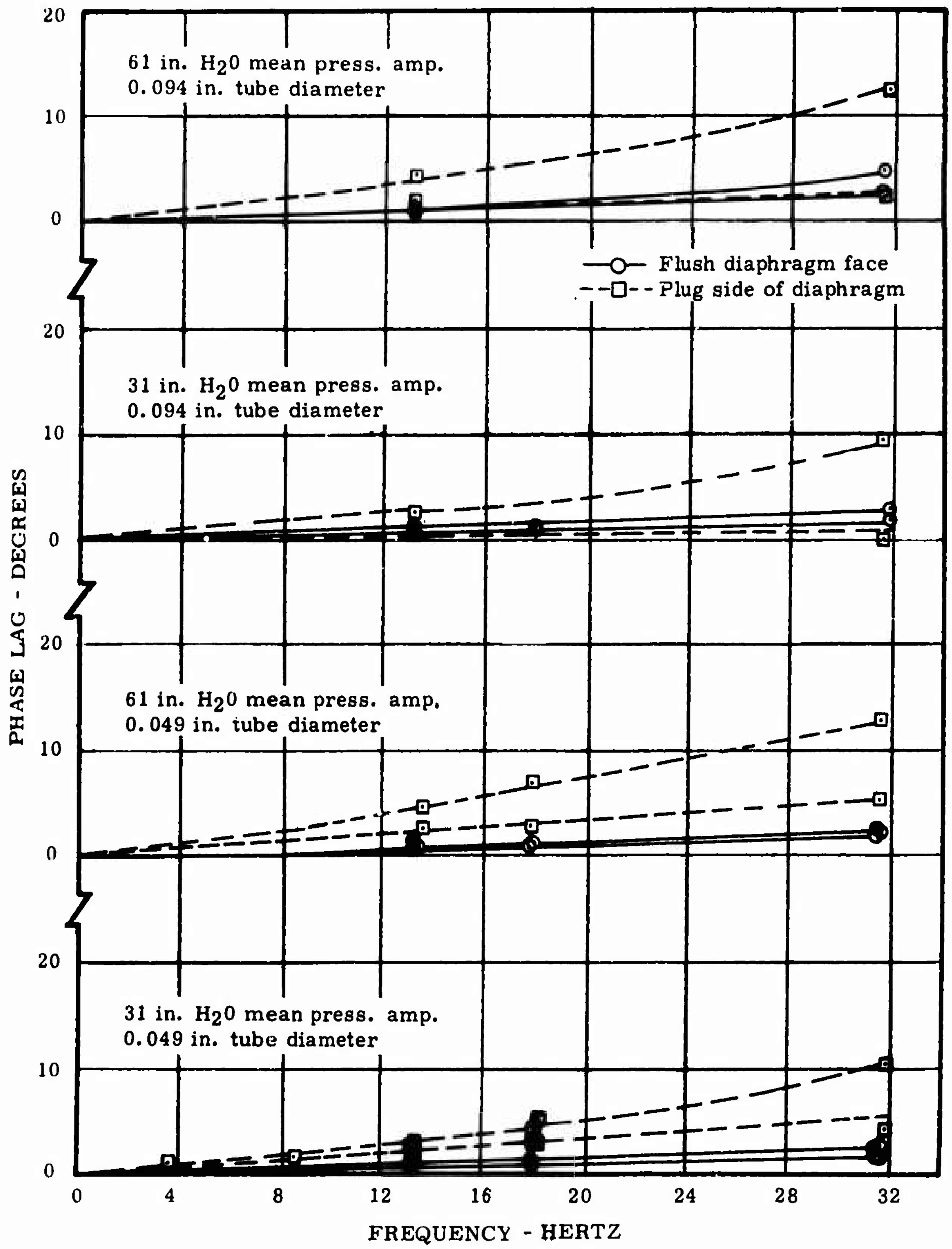

FIGURE 45. Phase Lag, Short Tubing Length (6 in.).

APPENDIX III
INSTANTANEOUS PRESSURE COEFFICIENTS

For the instantaneous pressure coefficient data sheets, the symbols are defined as follows:

AA	Angle of attack, α
DELTA AA	Oscillating Amplitude, $\Delta\alpha$
MEAN AA	Mean angle of attack, $\bar{\alpha}$

NOTE: X/C equals .01 is really .0075. This was rounded off to .01 for tabulation purposes only.

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 20 K = .0320 DELT AA = 4.01 MEAN AA = -.20

AA X/C	-.20	.83	1.80	2.63	3.27	3.67	3.80	3.67	3.27	2.63	1.80	.83
UPPER SURFACE												
.00	.90	.93	.93	.88	.76	.71	.69	.71	.76	.88	.95	.95
.01	.77	.60	.30	.04	-.22	-.42	-.55	-.52	-.45	-.32	.04	.27
.02	.12	-.16	-.41	-.66	-.91	-1.06	-1.17	-1.13	-1.02	-.99	-.66	-.45
.05	-.27	-.49	-.71	-.83	-.92	-1.01	-1.04	-1.04	-1.01	-.98	-.86	-.71
.10	-.22	-.32	-.47	-.57	-.64	-.72	-.75	-.75	-.75	-.68	-.57	-.47
.15	-.01	-.11	-.14	-.21	-.28	-.31	-.35	-.35	-.31	-.31	-.21	-.18
.20	-.36	-.45	-.55	-.61	-.67	-.74	-.74	-.74	-.74	-.70	-.58	-.55
.25	-.42	-.48	-.53	-.56	-.62	-.65	-.65	-.65	-.62	-.62	-.56	-.51
.35	-.33	-.40	-.46	-.49	-.53	-.56	-.56	-.56	-.56	-.56	-.46	-.46
.45	-.30	-.37	-.40	-.40	-.40	-.47	-.47	-.47	-.47	-.44	-.40	-.37
.60	-.24	-.31	-.31	-.35	-.35	-.35	-.38	-.35	-.38	-.35	-.31	-.35
.75	-.38	-.42	-.42	-.42	-.46	-.46	-.46	-.46	-.42	-.46	-.42	-.42
.90	-.11	-.11	-.11	-.11	-.08	-.11	-.11	-.11	-.11	-.11	-.08	-.11
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.90	.93	.93	.88	.76	.71	.69	.71	.76	.88	.95	.95
.01	.24	.55	.73	.86	.89	.92	.92	.92	.89	.86	.79	.61
.02	-.27	-.01	.20	.39	.50	.57	.61	.57	.53	.42	.31	.05
.05	-.55	-.32	-.17	-.02	.08	.12	.15	.12	.12	.01	-.13	-.28
.10	-.56	-.43	-.29	-.20	-.13	-.07	-.03	-.07	-.13	-.20	-.26	-.36
.15	-.50	-.41	-.31	-.24	-.21	-.14	-.11	-.14	-.18	-.24	-.31	-.37
.20	-.54	-.41	-.38	-.31	-.28	-.22	-.19	-.19	-.25	-.28	-.35	-.41
.25	-.52	-.41	-.38	-.29	-.29	-.24	-.21	-.24	-.27	-.29	-.35	-.41
.35	-.40	-.37	-.31	-.28	-.25	-.22	-.16	-.22	-.25	-.25	-.31	-.37
.45	-.39	-.29	-.26	-.26	-.23	-.23	-.19	-.23	-.26	-.23	-.26	-.32
.60	-.21	-.17	-.13	-.13	-.13	-.10	-.10	-.10	-.17	-.10	-.17	-.17
.75	-.14	-.11	-.14	-.11	-.11	-.08	-.05	-.11	-.14	-.08	-.11	-.14
.90	-.04	-.02	-.02	-.02	-.02	0.00	0.00	-.02	-.02	0.00	-.02	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 20   K = .0320   DELT AA = 4.01   MEAN AA = -.20

AA / X/C	-.19	-1.23	-2.20	-3.03	-3.67	-4.07	-4.20	-4.07	-3.67	-3.03	-2.20	-1.23
UPPER SURFACE												
.00	.95	.88	.71	.50	.31	.17	.05	.07	.21	.43	.67	.78
.01	.50	.73	.83	.90	.87	.93	.90	.90	.90	.90	.90	.90
.02	-.19	.05	.23	.41	.52	.62	.66	.66	.66	.59	.48	.37
.05	-.55	-.30	-.15	-.06	.09	.15	.21	.21	.18	.15	.02	-.09
.10	-.39	-.25	-.15	-.07	.02	.06	.09	.09	.09	.06	-.04	-.11
.15	-.11	-.01	.02	.08	.12	.18	.18	.18	.15	.15	.12	.02
.20	-.52	-.36	-.30	-.30	-.20	-.14	-.11	-.11	-.11	-.14	-.23	-.30
.25	-.51	-.39	-.36	-.30	-.27	-.24	-.22	-.22	-.22	-.24	-.27	-.33
.35	-.43	-.37	-.30	-.27	-.24	-.21	-.21	-.21	-.21	-.21	-.27	-.33
.45	-.37	-.30	-.23	-.23	-.23	-.19	-.19	-.19	-.23	-.19	-.26	-.23
.60	-.28	-.21	-.24	-.21	-.21	-.18	-.18	-.18	-.18	-.18	-.21	-.24
.75	-.38	-.34	-.34	-.38	-.34	-.34	-.34	-.34	-.34	-.38	-.42	-.38
.90	-.08	-.08	-.08	-.08	-.05	-.08	-.08	-.08	-.08	-.08	-.08	-.08
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.95	.88	.71	.50	.31	.17	.05	.07	.21	.43	.67	.78
.01	.36	.09	-.24	-.64	-.95	-1.14	-1.29	-1.20	-1.04	-.74	-.37	-.03
.02	-.16	-.42	-.71	-1.05	-1.31	-1.49	-1.57	-1.49	-1.38	-1.16	-.83	-.53
.05	-.47	-.58	-.81	-1.03	-1.14	-1.26	-1.29	-1.26	-1.14	-1.03	-.85	-.66
.10	-.49	-.62	-.75	-.88	-.95	-1.05	-1.08	-1.08	-1.01	-.91	-.75	-.65
.15	-.47	-.54	-.64	-.77	-.83	-.87	-.90	-.90	-.83	-.77	-.67	-.60
.20	-.51	-.57	-.64	-.70	-.77	-.80	-.86	-.83	-.77	-.74	-.67	-.57
.25	-.49	-.52	-.60	-.68	-.68	-.71	-.77	-.74	-.68	-.68	-.60	-.54
.35	-.40	-.43	-.48	-.51	-.57	-.60	-.63	-.63	-.57	-.54	-.46	-.46
.45	-.32	-.35	-.39	-.45	-.45	-.48	-.51	-.48	-.48	-.45	-.39	-.35
.60	-.13	-.17	-.21	-.24	-.24	-.24	-.24	-.28	-.28	-.24	-.21	-.21
.75	-.14	-.14	-.14	-.17	-.14	-.17	-.20	-.20	-.17	-.20	-.14	-.14
.90	-.02	-.02	-.02	-.04	-.02	-.04	-.07	-.07	-.04	-.04	-.02	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 21   K = .0513   DELT AA = 4.02   MEAN AA = -.20

AA X/C	-.20	.84	1.80	2.64	3.28	3.68	3.81	3.68	3.28	2.64	1.81	.84
UPPER SURFACE												
.00	.90	.93	.93	.88	.81	.74	.67	.71	.78	.88	.93	.90
.01	.77	.50	.27	0.00	-.25	-.42	-.52	-.49	-.39	-.15	.14	.33
.02	.05	-.16	-.45	-.70	-.91	-1.02	-1.17	-1.09	-.99	-.84	-.55	-.34
.05	-.34	-.55	-.71	-.86	-.92	-1.01	-1.04	-1.01	-.98	-.92	-.77	-.61
.10	-.22	-.36	-.47	-.57	-.64	-.68	-.75	-.75	-.68	-.61	-.50	-.39
.15	-.01	-.11	-.18	-.24	-.28	-.28	-.31	-.31	-.31	-.28	-.21	-.18
.20	-.36	-.45	-.55	-.61	-.67	-.67	-.74	-.74	-.67	-.61	-.58	-.49
.25	-.42	-.48	-.53	-.56	-.59	-.59	-.62	-.59	-.59	-.56	-.53	-.51
.35	-.33	-.40	-.46	-.49	-.49	-.53	-.59	-.56	-.53	-.49	-.46	-.43
.45	-.30	-.37	-.40	-.40	-.40	-.40	-.44	-.44	-.40	-.37	-.37	-.30
.60	-.24	-.28	-.31	-.31	-.35	-.31	-.35	-.35	-.35	-.31	-.28	-.28
.75	-.38	-.38	-.42	-.42	-.42	-.42	-.46	-.42	-.42	-.42	-.42	-.42
.90	-.08	-.11	-.11	-.14	-.08	-.08	-.11	-.08	-.08	-.08	-.08	-.08
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.90	.93	.93	.88	.81	.74	.67	.71	.78	.88	.93	.90
.01	.27	.55	.70	.86	.92	.95	.89	.89	.95	.86	.76	.58
.02	-.27	.02	.24	.39	.53	.57	.57	.61	.53	.42	.28	.05
.05	-.47	-.32	-.13	-.02	.08	.15	.15	.12	.12	.01	-.17	-.28
.10	-.52	-.39	-.29	-.20	-.10	-.07	-.07	-.07	-.10	-.16	-.26	-.43
.15	-.50	-.37	-.31	-.21	-.14	-.14	-.14	-.14	-.18	-.21	-.27	-.41
.20	-.54	-.41	-.35	-.28	-.25	-.22	-.22	-.22	-.22	-.25	-.31	-.44
.25	-.49	-.43	-.35	-.29	-.24	-.21	-.24	-.24	-.27	-.32	-.32	-.43
.35	-.43	-.34	-.31	-.28	-.25	-.22	-.22	-.19	-.22	-.25	-.28	-.37
.45	-.39	-.32	-.29	-.23	-.19	-.23	-.23	-.19	-.19	-.26	-.29	-.32
.60	-.21	-.17	-.17	-.13	-.06	-.10	-.06	-.10	-.10	-.10	-.13	-.17
.75	-.14	-.14	-.14	-.11	-.08	-.08	-.11	-.11	-.08	-.11	-.11	-.14
.90	-.07	-.04	-.04	-.02	-.02	-.02	-.02	-.02	-.02	-.02	-.02	-.04
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 21 K = .0513 DELT AA = 4.02 MEAN AA = -.20

AA / X/C	-.19	-1.23	-2.20	-3.04	-3.68	-4.08	-4.21	-4.08	-3.68	-3.04	-2.21	-1.24
UPPER SURFACE												
.00	.90	.81	.67	.38	.21	.09	.07	.14	.28	.47	.69	.83
.01	.60	.83	.87	.90	.90	.93	.93	.93	.90	.93	.90	.87
.02	-.05	.19	.34	.48	.59	.62	.66	.70	.62	.52	.41	.30
.05	-.46	-.24	-.09	.02	.15	.21	.21	.21	.18	.06	-.06	-.18
.10	-.29	-.18	-.07	0.00	.02	.09	.13	.09	.09	.02	-.07	-.15
.15	-.08	-.01	.05	.12	.12	.18	.18	.18	.18	.12	.08	.05
.20	-.39	-.30	-.27	-.20	-.14	-.11	-.08	-.11	-.11	-.20	-.27	-.30
.25	-.45	-.39	-.30	-.24	-.24	-.22	-.19	-.19	-.19	-.24	-.30	-.36
.35	-.33	-.33	-.27	-.24	-.21	-.17	-.17	-.17	-.17	-.24	-.27	-.30
.45	-.33	-.26	-.23	-.23	-.19	-.16	-.16	-.12	-.16	-.19	-.23	-.26
.60	-.24	-.24	-.18	-.18	-.18	-.18	-.11	-.14	-.14	-.21	-.21	-.21
.75	-.38	-.34	-.34	-.34	-.34	-.34	-.30	-.30	-.34	-.34	-.34	-.34
.90	-.08	-.08	-.08	-.05	-.05	-.05	-.05	-.08	-.05	-.08	-.08	-.08
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.90	.81	.67	.38	.21	.09	.07	.14	.28	.47	.69	.83
.01	.24	-.03	-.40	-.77	-1.11	-1.23	-1.29	-1.14	-.95	-.64	-.30	.06
.02	-.27	-.57	-.86	-1.20	-1.38	-1.53	-1.57	-1.46	-1.31	-1.09	-.83	-.49
.05	-.51	-.70	-.85	-1.07	-1.26	-1.29	-1.29	-1.22	-1.14	-1.03	-.81	-.62
.10	-.56	-.69	-.82	-.95	-1.01	-1.05	-1.08	-1.01	-.98	-.88	-.78	-.62
.15	-.50	-.60	-.70	-.80	-.87	-.87	-.93	-.83	-.83	-.77	-.64	-.54
.20	-.54	-.64	-.70	-.77	-.80	-.77	-.80	-.77	-.77	-.70	-.67	-.54
.25	-.49	-.60	-.63	-.71	-.74	-.74	-.74	-.71	-.71	-.68	-.60	-.54
.35	-.40	-.46	-.51	-.60	-.60	-.60	-.57	-.57	-.54	-.54	-.48	-.43
.45	-.35	-.39	-.45	-.48	-.51	-.48	-.51	-.48	-.48	-.45	-.35	-.35
.60	-.21	-.21	-.24	-.32	-.28	-.28	-.28	-.28	-.28	-.21	-.21	-.21
.75	-.14	-.17	-.20	-.20	-.20	-.20	-.17	-.17	-.17	-.17	-.14	-.11
.90	-.02	-.02	-.07	-.07	-.04	-.04	-.02	-.02	-.04	-.04	-.02	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 22 K = .0754 DELT AA = 4.03 MEAN AA = -.20

UPPER SURFACE

AA X/C	-.20	.84	1.81	2.64	3.28	3.69	3.82	3.69	3.29	2.65	1.81	.84
.00	.90	.90	.90	.88	.81	.69	.69	.71	.78	.83	.90	.90
.01	.80	.60	.33	.04	-.19	-.42	-.49	-.45	-.39	-.12	.14	.40
.02	.08	-.12	-.48	-.66	-.81	-1.06	-1.13	-1.06	-.99	-.77	-.52	-.30
.05	-.27	-.52	-.67	-.83	-.92	-1.01	-1.01	-1.01	-.98	-.89	-.74	-.61
.10	-.18	-.29	-.39	-.57	-.57	-.72	-.72	-.64	-.68	-.57	-.50	-.39
.15	-.01	-.04	-.18	-.21	-.21	-.35	-.35	-.31	-.31	-.21	-.18	-.11
.20	-.33	-.42	-.49	-.55	-.64	-.70	-.70	-.70	-.67	-.61	-.49	-.45
.25	-.39	-.45	-.51	-.56	-.59	-.65	-.62	-.62	-.56	-.56	-.51	-.48
.35	-.33	-.37	-.43	-.53	-.49	-.59	-.59	-.56	-.53	-.46	-.43	-.40
.45	-.26	-.30	-.37	-.37	-.40	-.44	-.44	-.44	-.37	-.33	-.33	-.30
.60	-.21	-.24	-.28	-.28	-.31	-.41	-.38	-.35	-.31	-.28	-.28	-.24
.75	-.30	-.34	-.42	-.42	-.42	-.46	-.51	-.46	-.42	-.42	-.38	-.42
.90	-.05	-.05	-.05	-.08	-.08	-.14	-.11	-.11	-.08	-.05	-.05	-.05
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

X/C	-.20	.84	1.81	2.64	3.28	3.69	3.82	3.69	3.29	2.65	1.81	.84
.00	.90	.90	.90	.88	.81	.69	.69	.71	.78	.83	.90	.90
.01	.24	.49	.64	.79	.83	.86	.89	.92	.89	.86	.76	.61
.02	-.31	-.01	.16	.35	.46	.53	.57	.57	.50	.42	.28	.05
.05	-.55	-.36	-.21	-.06	.01	.04	.12	.12	.08	.04	-.10	-.28
.10	-.56	-.46	-.33	-.23	-.20	-.13	-.10	-.10	-.13	-.20	-.29	-.43
.15	-.50	-.44	-.31	-.24	-.24	-.21	-.18	-.18	-.21	-.24	-.31	-.41
.20	-.54	-.44	-.38	-.31	-.31	-.28	-.25	-.25	-.28	-.31	-.35	-.48
.25	-.49	-.43	-.38	-.29	-.29	-.29	-.27	-.27	-.32	-.35	-.38	-.46
.35	-.40	-.37	-.31	-.28	-.28	-.25	-.25	-.25	-.31	-.31	-.34	-.43
.45	-.35	-.32	-.29	-.26	-.26	-.26	-.26	-.23	-.26	-.23	-.29	-.39
.60	-.21	-.13	-.13	-.13	-.21	-.21	-.13	-.17	-.17	-.21	-.21	-.24
.75	-.17	-.14	-.11	-.11	-.14	-.14	-.11	-.11	-.11	-.14	-.14	-.17
.90	-.04	-.02	-.02	-.02	-.04	-.04	-.02	-.02	-.02	-.02	-.04	-.04
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 22 K = .0754 DELT AA = 4.03 MEAN AA = -.20

AA / X/C	-.19	-1.24	-2.21	-3.04	-3.68	-4.09	-4.22	-4.09	-3.69	-3.05	-2.21	-1.24
UPPER SURFACE												
.00	.88	.81	.69	.47	.28	.14	.07	.05	.21	.38	.57	.76
.01	.60	.80	.87	.93	.90	.97	.97	.90	.97	.93	.93	.87
.02	-.09	.12	.30	.52	.59	.62	.70	.66	.62	.55	.44	.26
.05	-.43	-.24	-.12	.18	.15	.24	.27	.18	.18	.12	-.03	-.10
.10	-.29	-.22	-.11	.02	.09	.13	.13	.13	.13	.02	0.00	-.11
.15	-.01	.02	.02	.08	.15	.22	.18	.22	.15	.12	.08	.02
.20	-.39	-.39	-.30	-.17	-.14	-.08	-.08	-.08	-.11	-.17	-.20	-.33
.25	-.42	-.39	-.33	-.24	-.22	-.16	-.16	-.19	-.19	-.24	-.27	-.36
.35	-.37	-.33	-.27	-.27	-.21	-.14	-.14	-.17	-.17	-.17	-.24	-.27
.45	-.30	-.26	-.25	-.19	-.16	-.12	-.12	-.12	-.16	-.16	-.19	-.26
.60	-.22	-.21	-.21	-.18	-.14	-.11	-.11	-.14	-.18	-.14	-.18	-.18
.75	-.38	-.42	-.34	-.34	-.30	-.26	-.34	-.26	-.34	-.34	-.34	-.34
.90	-.05	-.08	-.05	-.05	-.05	-.02	-.65	-.08	-.08	-.02	-.05	-.08
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.68	.81	.69	.47	.28	.14	.07	.05	.21	.38	.57	.76
.01	.36	.02	-.27	-.64	-.95	-1.14	-1.26	-1.20	-1.01	-.83	-.46	-.12
.02	-.20	-.49	-.75	-1.05	-1.31	-1.42	-1.49	-1.49	-1.42	-1.16	-.94	-.60
.05	-.47	-.66	-.85	-.96	-1.18	-1.22	-1.29	-1.29	-1.22	-1.07	-.96	-.73
.10	-.49	-.72	-.82	-.91	-1.01	-1.01	-1.06	-1.08	-1.01	-.95	-.85	-.69
.15	-.50	-.64	-.70	-.80	-.93	-.87	-.93	-.93	-.87	-.77	-.70	-.60
.20	-.54	-.64	-.74	-.77	-.80	-.80	-.80	-.83	-.80	-.77	-.64	-.61
.25	-.54	-.60	-.68	-.71	-.74	-.74	-.74	-.74	-.71	-.65	-.63	-.57
.35	-.46	-.51	-.57	-.54	-.60	-.63	-.63	-.66	-.60	-.54	-.51	-.46
.45	-.35	-.45	-.48	-.48	-.48	-.51	-.51	-.51	-.48	-.45	-.45	-.39
.60	-.24	-.28	-.32	-.24	-.32	-.32	-.32	-.32	-.32	-.24	-.24	-.21
.75	-.23	-.26	-.20	-.20	-.23	-.20	-.23	-.23	-.20	-.20	-.17	-.14
.90	-.07	-.07	-.10	-.07	-.07	-.04	-.07	-.07	-.07	-.04	-.04	-.07
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 23   K =0.1011   DELT AA = 4.04   MEAN AA = -.20

AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
X/C												
						UPPER SURFACE						
.00	1.00	1.05	1.02	1.00	.93	.86	.86	.83	.88	.95	1.02	1.07
.01	.80	.67	.43	.23	-.05	-.25	-.32	-.32	-.25	-.05	.17	.43
.02	.23	-.01	-.27	-.48	-.70	-.88	-.91	-.88	-.88	-.70	-.48	-.23
.05	-.21	-.40	-.58	-.74	-.80	-.89	-.92	-.89	-.89	-.80	-.74	-.52
.10	-.07	-.18	-.29	-.39	-.47	-.57	-.57	-.57	-.57	-.47	-.39	-.29
.15	.08	-.01	-.04	-.11	-.14	-.24	-.21	-.21	-.18	-.14	-.11	-.04
.20	-.30	-.39	-.45	-.52	-.58	-.61	-.64	-.61	-.61	-.55	-.49	-.39
.25	-.27	-.33	-.39	-.42	-.48	-.48	-.48	-.48	-.45	-.42	-.42	-.33
.35	-.24	-.30	-.33	-.37	-.37	-.43	-.43	-.37	-.40	-.37	-.30	-.27
.45	-.23	-.26	-.30	-.30	-.33	-.30	-.33	-.30	-.30	-.30	-.26	-.19
.60	-.11	-.11	-.11	-.14	-.18	-.18	-.18	-.18	-.14	-.14	-.11	-.08
.75	-.18	-.22	-.22	-.22	-.22	-.22	-.22	-.14	-.18	-.22	-.18	-.14
.90	.06	.03	.03	.03	.03	.03	.03	.03	.03	.03	.03	.09
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	1.00	1.05	1.02	1.00	.93	.86	.86	.83	.88	.95	1.02	1.07
.01	.27	.55	.79	.89	.92	1.01	1.01	1.01	1.01	.95	.89	.76
.02	-.16	.02	.28	.46	.57	.68	.72	.72	.68	.61	.46	.28
.05	-.43	-.28	-.10	.04	.17	.19	.23	.23	.19	.15	.01	-.13
.10	-.43	-.36	-.23	-.13	-.03	-.03	.02	.02	0.00	-.03	-.13	-.20
.15	-.37	-.27	-.21	-.11	-.08	-.01	.01	-.01	-.04	-.08	-.11	-.21
.20	-.38	-.31	-.22	-.15	-.15	-.09	-.09	-.06	-.09	-.15	-.22	-.25
.25	-.35	-.29	-.21	-.16	-.16	-.10	-.10	-.07	-.10	-.16	-.21	-.27
.35	-.25	-.22	-.19	-.13	-.13	-.10	-.10	-.07	-.13	-.13	-.13	-.22
.45	-.23	-.16	-.13	-.10	-.10	-.10	-.07	-.07	-.07	-.10	-.13	-.13
.60	-.06	-.02	-.02	0.00	0.00	-.02	-.02	0.00	-.06	-.06	-.02	-.06
.75	.06	.03	.06	.06	.06	.06	.08	.06	.06	.06	.06	.03
.90	.14	.08	.08	.08	.08	.11	.08	.11	.11	.11	.11	.08
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 23 K =0.1011 DELT AA = 4.04 MEAN AA = -.20

AA	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
X/C												
UPPER SURFACE												
.00	1.02	1.00	.86	.67	.47	.31	.24	.24	.31	.53	.67	.88
.01	.70	.87	.97	1.03	1.03	1.06	1.06	1.06	1.03	1.06	1.06	1.00
.02	-.01	.19	.41	.55	.66	.80	.80	.80	.77	.70	.59	.37
.05	-.37	-.21	-.06	.12	.18	.27	.30	.30	.30	.18	.09	-.12
.10	-.18	-.07	.02	.06	.17	.20	.24	.24	.20	.17	.06	.02
.15	.02	.08	.12	.18	.22	.25	.29	.25	.25	.25	.18	.08
.20	-.33	-.27	-.23	-.14	-.08	-.08	-.02	-.05	-.08	-.08	-.17	-.23
.25	-.30	-.27	-.22	-.16	-.13	-.07	-.04	-.07	-.10	-.07	-.16	-.24
.35	-.24	-.17	-.14	-.11	-.08	-.08	-.05	-.05	-.08	-.05	-.11	-.21
.45	-.19	-.16	-.16	-.09	-.12	-.09	-.02	-.05	-.02	-.09	-.09	-.19
.60	-.08	-.04	-.01	-.04	-.04	-.01	-.01	.02	-.01	-.01	-.01	-.08
.75	-.14	-.10	-.14	-.14	-.14	-.22	-.10	-.10	-.14	-.10	-.14	-.18
.90	.06	.09	.06	.06	.03	.06	.06	.06	.06	.06	.09	.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	1.02	1.00	.86	.67	.47	.31	.24	.24	.31	.50	.67	.88
.01	.55	.30	-.06	-.40	-.74	-.95	-1.08	-1.08	-.92	-.71	-.40	-.03
.02	.02	-.23	-.53	-.79	-1.09	-1.23	-1.34	-1.34	-1.27	-1.05	-.79	-.49
.05	-.28	-.47	-.70	-.85	-1.03	-1.07	-1.14	-1.11	-1.07	-.92	-.81	-.62
.10	-.36	-.52	-.65	-.78	-.85	-.91	-.91	-.95	-.88	-.75	-.69	-.59
.15	-.31	-.41	-.50	-.60	-.67	-.74	-.74	-.74	-.70	-.64	-.54	-.47
.20	-.35	-.41	-.54	-.57	-.67	-.67	-.64	-.64	-.64	-.57	-.54	-.44
.25	-.32	-.38	-.49	-.54	-.60	-.57	-.57	-.57	-.57	-.52	-.49	-.43
.35	-.25	-.34	-.40	-.43	-.43	-.46	-.46	-.46	-.43	-.37	-.34	-.31
.45	-.19	-.26	-.32	-.29	-.35	-.32	-.32	-.32	-.32	-.29	-.26	-.26
.60	-.10	-.13	-.17	-.17	-.17	-.21	-.17	-.17	-.13	-.13	-.10	-.06
.75	.03	0.00	-.02	-.02	-.05	-.02	-.02	-.02	0.00	0.00	0.00	.03
.90	.06	.08	.06	.06	.06	.06	.08	.08	.11	.08	.11	.11
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 24 K =0.1299 DELT AA = 4.05 MEAN AA = -.20

UPPER SURFACE

AA / X/C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
.00	1.02	1.07	1.09	1.02	.97	.93	.88	.88	.90	.97	1.05	1.09
.01	.90	.70	.43	.20	-.09	-.22	-.29	-.39	-.25	-.09	.14	.40
.02	.23	-.01	-.23	-.63	-.73	-.81	-.91	-.91	-.88	-.73	-.52	-.27
.05	-.15	-.37	-.58	-.77	-.83	-.95	-.92	-.92	-.89	-.80	-.77	-.58
.10	-.07	-.22	-.32	-.47	-.50	-.54	-.57	-.57	-.57	-.54	-.47	-.32
.15	.08	-.04	-.04	-.18	-.38	-.24	-.24	-.24	-.18	-.21	-.14	-.14
.20	-.30	-.39	-.52	-.55	-.64	-.64	-.64	-.64	-.61	-.55	-.52	-.42
.25	-.27	-.39	-.39	-.42	-.48	-.53	-.48	-.48	-.48	-.48	-.45	-.36
.35	-.24	-.30	-.33	-.40	-.43	-.40	-.43	-.43	-.43	-.37	-.37	-.33
.45	-.19	-.26	-.30	-.37	-.30	-.33	-.33	-.30	-.33	-.30	-.30	-.23
.60	-.08	-.11	-.18	-.18	-.18	-.18	-.18	-.14	-.18	-.14	-.14	-.11
.75	-.18	-.22	-.22	-.26	-.26	-.26	-.26	-.26	-.26	-.26	-.22	-.18
.90	.03	.03	0.00	0.00	-.02	.03	.03	0.00	-.02	0.00	0.00	.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

X/C												
.00	1.02	1.07	1.09	1.02	.97	.93	.88	.88	.90	.97	1.05	1.09
.01	.33	.55	.76	.92	.98	1.01	1.04	1.04	1.01	.98	.92	.79
.02	-.16	.05	.31	.53	.61	.72	.76	.76	.68	.65	.50	.39
.05	-.40	-.25	-.10	.04	.15	.23	.27	.27	.23	.15	.04	-.02
.10	-.43	-.29	-.20	-.07	0.00	.05	.05	.02	.02	-.03	-.10	-.20
.15	-.31	-.24	-.18	-.08	-.04	.01	.01	.01	.01	-.04	-.11	-.18
.20	-.38	-.28	-.22	-.15	-.12	-.09	-.06	-.06	-.09	-.12	-.19	-.22
.25	-.32	-.27	-.21	-.16	-.13	-.10	-.07	-.07	-.13	-.13	-.21	-.21
.35	-.25	-.19	-.16	-.10	-.10	-.07	-.04	-.07	-.10	-.13	-.13	-.19
.45	-.13	-.10	-.10	-.07	-.07	0.00	0.00	-.04	-.07	-.07	-.07	-.13
.60	-.06	0.00	0.00	0.00	0.00	0.00	.04	0.00	0.00	0.00	-.02	-.06
.75	.08	.11	.08	.08	.11	.08	.11	.11	.06	.06	.08	.06
.90	.14	.14	.11	.11	.11	.14	.17	.14	.11	.14	.11	.11
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 24 K =0.1299 DELT AA = 4.05 MEAN AA = -.20

AA X/C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						UPPER SURFACE						
.00	1.07	1.02	.88	.71	.55	.38	.31	.28	.36	.50	.69	.88
.01	.63	.83	.93	.97	1.03	1.03	1.03	1.03	1.03	.97	1.00	.97
.02	-.05	.16	.34	.48	.62	.73	.73	.73	.73	.70	.52	.44
.05	-.40	-.24	-.09	.02	.15	.18	.24	.30	.27	.21	.09	-.06
.10	-.25	-.11	-.07	.02	.13	.20	.20	.20	.17	.17	.06	0.00
.15	-.01	.05	.05	.12	.15	.18	.25	.25	.18	.22	.15	.08
.20	-.39	-.30	-.27	-.14	-.11	-.08	-.08	-.08	-.08	-.11	-.17	-.23
.25	-.36	-.30	-.19	-.16	-.13	-.10	-.07	-.07	-.10	-.13	-.19	-.24
.35	-.27	-.24	-.17	-.14	-.08	-.08	-.08	-.11	-.14	-.11	-.17	-.17
.45	-.23	-.23	-.16	-.12	-.12	-.12	-.05	-.09	-.12	-.16	-.16	-.12
.60	-.11	-.08	-.04	-.04	-.04	-.01	-.01	-.01	-.01	-.04	-.04	-.08
.75	-.18	-.22	-.14	-.14	-.14	-.14	-.14	-.14	-.18	-.14	-.26	-.18
.90	.03	.03	.06	.06	.06	.06	.06	.06	.03	.06	.03	.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	1.07	1.02	.88	.71	.55	.38	.31	.28	.36	.50	.69	.88
.01	.58	.30	-.03	-.37	-.64	-.86	-.98	-.98	-.89	-.67	-.37	-.03
.02	.13	-.16	-.46	-.71	-.97	-1.12	-1.23	-1.23	-1.16	-1.01	-.79	-.46
.05	-.25	-.43	-.62	-.81	-.88	-.99	-1.07	-1.03	-1.03	-.92	-.77	-.58
.10	-.36	-.46	-.59	-.69	-.78	-.82	-.88	-.85	-.85	-.75	-.69	-.56
.15	-.27	-.41	-.50	-.54	-.64	-.64	-.67	-.67	-.64	-.60	-.54	-.44
.20	-.31	-.38	-.48	-.54	-.57	-.57	-.57	-.57	-.57	-.57	-.51	-.44
.25	-.32	-.38	-.46	-.49	-.54	-.52	-.54	-.52	-.52	-.49	-.49	-.43
.35	-.28	-.28	-.34	-.40	-.40	-.40	-.43	-.37	-.40	-.37	-.34	-.28
.45	-.16	-.26	-.23	-.26	-.26	-.32	-.29	-.29	-.26	-.23	-.19	-.19
.60	-.06	-.06	-.10	-.13	-.13	-.13	-.13	-.13	-.13	-.10	-.10	-.06
.75	.03	.03	0.00	0.00	0.00	.03	.03	0.00	.03	.03	.03	.06
.90	.08	.11	.11	.08	.08	.11	.14	.11	.14	.11	.11	.11
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 25 K = .1588 DELT AA = 4.06 MEAN AA = -.20

UPPER SURFACE

AA / X/C	-.20	.85	1.82	2.67	3.31	3.72	3.85	3.72	3.31	2.67	1.83	.85
.00	1.00	1.05	1.02	1.00	.95	.90	.86	.86	.93	.97	1.02	1.07
.01	.90	.73	.37	.20	-.05	-.19	-.29	-.32	-.15	0.00	.33	.57
.02	.05	-.16	-.45	-.66	-.88	-1.06	-1.09	-1.02	-.95	-.81	-.63	-.30
.05	-.21	-.34	-.58	-.77	-.80	-.86	-.92	-.89	-.86	-.86	-.61	-.46
.10	-.11	-.18	-.29	-.43	-.47	-.64	-.61	-.54	-.50	-.47	-.32	-.22
.15	.05	-.01	-.08	-.14	-.21	-.24	-.28	-.24	-.21	-.14	-.08	-.04
.20	-.30	-.36	-.45	-.52	-.58	-.61	-.61	-.61	-.58	-.52	-.42	-.36
.25	-.30	-.33	-.39	-.45	-.45	-.48	-.48	-.45	-.51	-.42	-.36	-.30
.35	-.24	-.30	-.33	-.37	-.40	-.43	-.43	-.37	-.33	-.37	-.27	-.24
.45	-.23	-.23	-.30	-.33	-.33	-.33	-.30	-.33	-.26	-.26	-.23	-.16
.60	-.11	-.11	-.14	-.18	-.18	-.21	-.18	-.14	-.11	-.14	-.08	-.04
.75	-.18	-.18	-.22	-.22	-.30	-.30	-.22	-.22	-.22	-.18	-.14	-.10
.90	.03	.03	.03	0.00	0.00	0.00	.03	.03	.06	.06	.06	.09
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

AA / X/C	-.20	.85	1.82	2.67	3.31	3.72	3.85	3.72	3.31	2.67	1.83	.85
.00	1.00	1.05	1.02	1.00	.95	.90	.86	.86	.93	.97	1.02	1.07
.01	.21	.55	.76	.86	.95	.98	.98	.98	.[illegible]8	.95	.89	.76
.02	-.20	.09	.20	.42	.57	.61	.65	.68	.65	.57	.46	.31
.05	-.43	-.25	-.10	.01	.08	.12	.19	.19	.12	.08	.01	-.10
.10	-.43	-.29	-.23	-.13	-.07	0.00	0.00	0.00	-.07	-.13	-.16	-.23
.15	-.37	-.27	-.21	-.14	-.08	-.04	-.04	-.04	-.04	-.11	-.18	-.24
.20	-.38	-.28	-.25	-.19	-.15	-.15	-.12	-.12	-.15	-.19	-.22	-.28
.25	-.38	-.29	-.21	-.18	-.16	-.16	-.13	-.13	-.16	-.21	-.24	-.27
.35	-.28	-.22	-.19	-.16	-.13	-.13	-.13	-.10	-.16	-.16	-.19	-.25
.45	-.19	-.16	-.10	-.13	-.07	-.10	-.10	-.10	-.10	-.13	-.13	-.16
.60	-.10	-.02	-.06	-.06	-.06	-.02	-.06	-.06	-.06	-.10	-.10	-.06
.75	.03	.06	.03	.06	.06	.03	.03	0.00	.06	.03	0.00	.03
.90	.11	.11	.11	.08	.11	.08	.08	.11	.08	.11	.08	.11
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 25 K = .1588 DELT AA = 4.06 MEAN AA = -.20

AA X/C	-.19	-1.24	-2.22	-3.07	-3.71	-4.12	-4.25	-4.12	-3.71	-3.07	-2.23	-1.25
							UPPER SURFACE					
.00	1.05	1.00	.90	.74	.55	.36	.31	.28	.36	.50	.67	.83
.01	.73	.87	1.00	1.03	1.03	1.00	.97	.93	1.00	1.00	.97	.93
.02	-.16	.16	.26	.41	.52	.55	.55	.52	.52	.48	.30	.16
.05	-.37	-.12	.02	.12	.21	.24	.24	.27	.24	.15	0.00	-.15
.10	-.15	0.00	0.00	.13	.13	.17	.20	.20	.17	.13	.02	-.04
.15	.02	.08	.18	.18	.25	.22	.25	.25	.22	.15	.15	.08
.20	-.27	-.23	-.14	-.11	-.11	-.08	-.08	-.11	-.11	-.11	-.23	-.27
.25	-.24	-.19	-.13	-.13	-.07	-.07	-.07	-.10	-.13	-.16	-.24	-.24
.35	-.17	-.14	-.11	-.08	-.05	-.05	-.08	-.14	-.11	-.11	-.21	-.24
.45	-.16	-.16	-.12	-.09	-.09	-.05	-.09	-.12	-.12	-.12	-.19	-.23
.60	-.01	-.01	-.01	-.04	.02	-.04	-.01	-.04	-.04	-.04	-.08	-.14
.75	-.14	-.14	-.10	-.10	-.10	-.14	-.14	-.18	-.14	-.18	-.18	-.26
.90	.09	.09	.09	.09	.09	.09	.06	.03	.03	.06	.03	.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
							LOWER SURFACE					
.00	1.05	1.00	.90	.74	.55	.36	.31	.28	.36	.50	.67	.83
.01	.55	.30	0.00	-.27	-.61	-.86	-.98	-.98	-.89	-.67	-.43	-.12
.02	.09	-.23	-.42	-.71	-.90	-1.16	-1.20	-1.20	-1.16	-1.01	-.75	-.49
.05	-.21	-.47	-.55	-.77	-.92	-1.03	-1.11	-1.07	-1.03	-.92	-.81	-.66
.10	-.36	-.49	-.62	-.69	-.78	-.85	-.91	-.91	-.85	-.78	-.69	-.62
.15	-.31	-.41	-.50	-.54	-.57	-.70	-.64	-.70	-.64	-.57	-.54	-.47
.20	-.35	-.44	-.51	-.54	-.57	-.61	-.67	-.64	-.64	-.54	-.54	-.48
.25	-.32	-.41	-.46	-.54	-.54	-.54	-.57	-.57	-.52	-.49	-.49	-.43
.35	-.25	-.31	-.34	-.43	-.43	-.48	-.48	-.48	-.43	-.40	-.34	-.34
.45	-.23	-.29	-.26	-.26	-.32	-.35	-.39	-.29	-.29	-.26	-.23	-.26
.60	-.13	-.06	-.13	-.17	-.21	-.17	-.17	-.13	-.13	-.13	-.10	-.06
.75	-.05	0.00	0.00	0.00	.03	-.02	-.02	-.02	0.00	.03	0.00	.06
.90	.08	.08	.08	.08	.08	.08	.14	.08	.08	.11	.08	.08
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 26 K = .1909 DELT AA = 4.08 MEAN AA = -.20

AA X/C	-.20	.85	1.83	2.68	3.33	3.74	3.87	3.74	3.33	2.68	1.84	.85
						UPPER SURFACE						
.00	.90	.95	.95	.90	.88	.78	.76	.78	.81	.90	.95	.95
.01	.83	.53	.30	.14	-.05	-.22	-.32	-.25	-.19	-.02	.20	.47
.02	.08	-.23	-.48	-.63	-.77	-.95	-.99	-1.02	-.91	-.73	-.55	-.34
.05	-.27	-.58	-.77	-.80	-.92	-.92	-1.01	-.95	-.92	-.89	-.74	-.58
.10	-.18	-.36	-.50	-.50	-.57	-.61	-.68	-.64	-.61	-.54	-.47	-.36
.15												
.20	-.36	-.52	-.58	-.58	-.64	-.67	-.67	-.70	-.67	-.61	-.55	-.49
.25	-.45	-.51	-.53	-.51	-.56	-.59	-.62	-.53	-.53	-.53	-.51	-.42
.35	-.33	-.46	-.49	-.46	-.53	-.49	-.49	-.49	-.46	-.43	-.40	-.37
.45	-.30	-.40	-.44	-.44	-.40	-.44	-.44	-.40	-.40	-.37	-.30	-.33
.60	-.24	-.31	-.31	-.24	-.28	-.31	-.31	-.31	-.28	-.24	-.21	-.21
.75	-.22	-.34	-.34	-.26	-.34	-.34	-.34	-.38	-.30	-.26	-.26	-.30
.90	-.02	-.08	-.08	-.08	-.08	-.08	-.08	-.08	-.05	-.02	-.02	-.05
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	.90	.95	.95	.90	.88	.78	.76	.78	.81	.90	.95	.95
.01	.27	.49	.70	.86	.92	.95	.95	.98	.95	.89	.83	.64
.02	-.20	.02	.24	.42	.53	.57	.61	.61	.53	.50	.31	.16
.05	-.43	-.25	-.10	.01	.08	.12	.12	.12	.08	.04	-.06	-.25
.10	-.46	-.36	-.29	-.16	-.13	-.10	-.07	-.07	-.16	-.16	-.23	-.39
.15	-.41	-.34	-.24	-.21	-.14	-.14	-.14	-.14	-.21	-.18	-.27	-.37
.20	-.51	-.44	-.38	-.31	-.28	-.28	-.28	-.28	-.31	-.35	-.41	-.48
.25	-.38	-.32	-.27	-.21	-.21	-.21	-.21	-.24	-.24	-.27	-.32	-.38
.35	-.28	-.25	-.22	-.19	-.16	-.19	-.16	-.19	-.19	-.25	-.28	-.34
.45	-.16	-.13	-.10	-.13	-.10	-.10	-.10	-.10	-.13	-.13	-.16	-.23
.60	-.06	-.06	-.02	-.06	-.06	-.06	-.06	-.06	-.13	-.10	-.10	-.21
.75	-.02	-.02	-.02	0.00	0.00	-.05	-.05	-.05	-.08	-.05	-.05	-.11
.90	0.00	.03	.03	.03	.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 25 K = .1909 DELT AA = 4.08 MEAN AA = -.20

AA / X/C	-.19	-1.25	-2.23	-3.08	-3.73	-4.14	-4.27	-4.14	-3.73	-3.08	-2.24	-1.25
UPPER SURFACE												
.00	.93	.86	.76	.59	.43	.31	.17	.26	.36	.45	.67	.81
.01	.63	.80	.93	.93	.97	1.00	1.00	1.00	.93	.93	.93	.90
.02	-.16	.05	.26	.37	.48	.55	.55	.55	.55	.48	.37	.23
.05	-.43	-.27	-.12	0.00	.09	.18	.18	.15	.12	.09	-.06	-.18
.10	-.29	-.18	-.11	0.00	.06	.13	.13	.09	.09	.02	-.04	-.15
.15												
.20	-.39	-.33	-.30	-.20	-.17	-.14	-.14	-.14	-.17	-.23	-.30	-.36
.25	-.42	-.36	-.30	-.24	-.22	-.19	-.22	-.16	-.22	-.24	-.30	-.33
.35	-.33	-.30	-.30	-.24	-.17	-.17	-.27	-.21	-.24	-.27	-.27	-.33
.45	-.30	-.23	-.26	-.23	-.19	-.19	-.16	-.23	-.23	-.23	-.26	-.30
.60	-.18	-.21	-.18	-.14	-.18	-.14	-.11	-.11	-.18	-.21	-.18	-.24
.75	-.18	-.26	-.22	-.18	-.22	-.22	-.18	-.22	-.22	-.26	-.26	-.26
.90	-.02	-.05	-.05	-.05	-.02	0.00	0.00	-.02	-.05	-.05	-.05	-.08
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.93	-.86	.76	.59	.43	.31	.17	.26	.36	.45	.67	.81
.01	.42	.15	-.15	-.46	-.67	-.89	-2.46	-.95	-.80	-.61	-.30	.02
.02	-.08	-.34	-.60	-.86	-1.05	-1.20	-5.83	-1.23	-1.12	-.97	-.68	-.46
.05	-.40	-.58	-.73	-.88	-1.03	-1.11	-8.51	-1.11	-1.03	-.92	-.81	-.58
.10	-.49	-.62	-.72	-.82	-.88	-.91	3.12	-.95	-.85	-.85	-.72	-.62
.15	-.47	-.57	-.64	-.70	-.74	-.77	1.66	-.77	-.74	-.70	-.60	-.47
.20	-.57	-.61	-.70	-.74	-.77	-.80	-.31	-.80	-.77	-.74	-.64	-.57
.25	-.46	-.52	-.57	-.60	-.63	-.60	-.63	-.60	-.57	-.57	-.52	-.43
.35	-.37	-.43	-.48	-.48	-.48	-.46	-.48	-.48	-.46	-.43	-.40	-.34
.45	-.26	-.29	-.32	-.29	-.32	-.29	-.32	-.32	-.29	-.29	-.23	-.16
.60	-.17	-.21	-.21	-.17	-.21	-.21	-.17	-.17	-.13	-.13	-.10	-.10
.75	-.05	-.11	-.11	-.11	-.11	-.08	-.08	-.08	-.05	-.05	-.02	-.02
.90	-.02	-.02	-.02	0.00	-.02	0.00	0.00	-.02	0.00	0.00	0.00	.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 27 K = .2278 DELT AA = 4.10 MEAN AA = -.20

AA X/C	-.20	.86	1.84	2.69	3.35	3.76	3.89	3.76	3.35	2.69	1.85	.86
UPPER SURFACE												
.00	.90	.97	.95	.95	.88	.81	.74	.76	.81	.86	.93	.95
.01	.90	.80	.53	.33	.07	-.09	-.19	-.25	-.15	-.02	.23	.47
.02	.05	-.09	-.34	-.55	-.73	-.88	-1.13	-.99	-.88	-.84	-.55	-.45
.05	-.37	-.52	-.74	-.83	-.92	-.98	-1.04	-1.04	-1.11	-.98	-.83	-.67
.10	-.18	-.22	-.36	-.39	-.50	-.54	-.57	-.54	-.54	-.54	-.50	-.29
.15												
.20	-.11	-.39	-.45	-.52	-.58	-.58	-.64	-.61	-.61	-.58	-.49	-.42
.25	-.36	-.39	-.42	-.48	-.45	-.53	-.53	-.53	-.51	-.48	-.45	-.39
.35	-.30	-.37	-.40	-.40	-.43	-.43	-.46	-.46	-.43	-.40	-.30	-.30
.45	-.26	-.37	-.33	-.37	-.30	-.33	-.37	-.37	-.37	-.30	-.26	-.26
.60	-.18	-.24	-.24	-.21	-.21	-.21	-.24	-.28	-.21	-.21	-.18	-.14
.75	-.26	-.26	-.22	-.14	-.22	-.22	-.26	-.26	-.22	-.18	-.14	-.18
.90	-.11	-.02	0.00	-.02	-.02	-.02	-.02	-.02	0.00	0.00	0.00	.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.90	.97	.95	.95	.88	.81	.74	.76	.81	.86	.93	.95
.01	.21	.49	.70	.79	.92	.89	.92	.92	.92	.89	.83	.70
.02	-.23	-.01	.20	.35	.50	.57	.53	.57	.53	.46	.31	.20
.05	-.51	-.32	-.17	-.06	.04	.12	.12	.12	.04	.01	-.06	-.21
.10	-.52	-.39	-.29	-.20	-.13	-.13	-.13	-.13	-.16	-.23	-.29	-.36
.15	-.47	-.34	-.31	-.24	-.18	-.14	-.18	-.18	-.21	-.21	-.27	-.37
.20	-.57	-.48	-.44	-.41	-.35	-.35	-.35	-.38	-.38	-.41	-.44	-.51
.25	-.43	-.35	-.29	-.27	-.24	-.21	-.21	-.24	-.27	-.32	-.35	-.41
.35	-.31	-.28	-.25	-.25	-.22	-.22	-.22	-.25	-.28	-.28	-.31	-.37
.45	-.16	-.16	-.13	-.13	-.10	-.13	-.13	-.13	-.19	-.19	-.23	-.23
.60	-.13	-.10	-.10	-.06	-.10	-.13	-.02	-.13	-.13	-.17	-.13	-.21
.75	-.05	-.02	-.02	-.02	-.02	-.02	-.05	-.08	-.11	-.11	-.11	-.11
.90	0.00	0.00	0.00	0.00	-.02	0.00	-.02	-.02	-.04	-.02	-.02	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 27   K = .2278   DELT AA = 4.10   MEAN AA = -.20

AA / X/C	-.19	-1.26	-2.24	-3.09	-3.75	-4.15	-4.29	-4.16	-3.75	-3.10	-2.25	-1.26
UPPER SURFACE												
.00	.93	.90	.86	.64	.45	.36	.26	.26	.33	.47	.62	.76
.01	.70	.87	.97	1.06	1.06	1.06	1.06	1.03	1.03	1.03	1.00	.97
.02	-.16	-.01	.23	.37	.48	.52	.52	.59	.55	.48	.37	.19
.05	-.52	-.40	-.24	-.09	.02	.09	.09	.09	.06	0.00	-.09	-.24
.10	-.22	-.11	-.07	.06	1.16	.17	.17	.17	.13	.06	.02	-.04
.15												
.20	-.33	-.27	-.23	-.17	-.11	-.08	-.08	-.05	-.11	-.14	-.23	-.30
.25	-.36	-.27	-.24	-.19	-.16	-.13	-.13	-.13	-.16	-.19	-.24	-.30
.35	-.27	-.21	-.14	-.14	-.14	-.11	-.08	-.08	-.14	-.17	-.17	-.27
.45	-.19	-.16	-.16	-.16	-.09	-.09	-.12	-.09	-.09	-.16	-.19	-.23
.60	-.14	-.08	-.08	-.11	-.11	-.08	-.11	-.08	-.08	-.14	-.14	-.18
.75	-.14	-.14	-.05	-.10	-.10	-.05	-.14	-.14	-.14	-.18	-.18	-.22
.90	0.00	.03	.06	.03	.03	.03	.03	.03	.06	0.00	0.00	.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.93	.90	.86	.64	.45	.36	.26	.26	.33	.47	.62	.76
.01	.49	.24	-.06	-.34	-.61	-.83	-.92	-.92	-.83	-.61	-.37	-.06
.02	-.01	-.27	-.57	-.75	-1.01	-1.20	-1.23	-1.23	-1.16	-.97	-.79	-.49
.05	-.43	-.51	-.70	-.85	-.99	-1.03	-1.11	-1.11	-1.07	-.92	-.81	-.70
.10	-.49	-.59	-.69	-.78	-.88	-.88	-.95	-.91	-.88	-.82	-.72	-.59
.15	-.44	-.54	-.64	-.64	-.74	-.80	-.77	-.74	-.74	-.67	-.67	-.54
.20	-.61	-.64	-.70	-.77	-.80	-.80	-.83	-.80	-.77	-.77	-.70	-.61
.25	-.46	-.52	-.60	-.60	-.65	-.63	-.63	-.60	-.57	-.52	-.52	-.46
.35	-.40	-.43	-.46	-.51	-.48	-.51	-.51	-.48	-.46	-.43	-.37	-.34
.45	-.26	-.35	-.32	-.35	-.35	-.32	-.32	-.29	-.29	-.23	-.23	-.16
.60	-.21	-.17	-.24	-.21	-.21	-.21	-.21	-.21	-.17	-.13	-.13	-.10
.75	-.11	-.11	-.14	-.14	-.11	-.11	-.11	-.08	-.05	-.05	-.02	-.05
.90	-.04	-.02	-.02	-.02	-.02	0.00	.03	0.00	0.00	0.00	0.00	.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 28 K = .2695 DELT AA = 4.12 MEAN AA = -.20

AA X/C	-.20	.86	1.85	2.71	3.36	3.77	3.91	3.77	3.36	2.71	1.86	.86
						UPPER SURFACE						
.00	.90	.95	.93	.93	.90	.83	.83	.81	.86	.88	.90	.93
.01	.83	.63	.40	.17	-.09	-.09	-.15	-.09	-.02	.20	.37	.57
.02	-.19	-.45	-.66	-.84	-.99	-1.09	-1.09	-1.06	-.95	-.81	-.63	-.45
.05	-.77	-.95	-1.14	-1.23	-1.29	-1.29	-1.38	-1.29	-1.29	-1.17	-1.11	-.92
.10	-.36	-.50	-.54	-.61	-.68	-.72	-.72	-.72	-.64	-.61	-.54	-.43
.15												
.20	-.45	-.49	-.55	-.58	-.53	-.61	-.61	-.58	-.55	-.52	-.45	-.39
.25	-.42	-.45	-.48	-.51	-.51	-.51	-.51	-.48	-.48	-.42	-.39	-.39
.35	-.33	-.37	-.40	-.43	-.40	-.40	-.37	-.37	-.43	-.33	-.33	-.24
.45	-.26	-.33	-.33	-.33	-.33	-.33	-.30	-.26	-.30	-.19	-.16	-.16
.60	-.28	-.28	-.28	-.28	-.24	-.24	-.18	-.18	-.18	-.18	-.18	-.14
.75	-.26	-.26	-.22	-.18	-.18	-.14	-.18	-.14	-.14	-.14	-.14	-.14
.90	0.00	-.02	0.00	0.00	0.00	.06	.06	.06	.06	.06	0.00	.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	.90	.95	.93	.93	.90	.83	.83	.81	.86	.88	.90	.93
.01	.18	.46	.64	.76	.89	.95	.95	.95	.95	.89	.79	.67
.02	-.27	-.05	.16	.31	.46	.57	.61	.61	.61	.50	.31	.16
.05	-.51	-.32	-.21	-.06	.01	.12	.15	.12	.12	-.02	-.06	-.25
.10	-.52	-.46	-.33	-.23	-.16	-.13	-.10	-.13	-.13	-.23	-.33	-.39
.15	-.54	-.50	-.41	-.34	-.27	-.27	-.27	-.24	-.27	-.34	-.41	-.50
.20	-.61	-.57	-.51	-.48	-.41	-.38	-.38	-.41	-.41	-.44	-.54	-.61
.25	-.43	-.38	-.32	-.29	-.24	-.24	-.24	-.24	-.27	-.32	-.38	-.43
.35	-.37	-.34	-.31	-.28	-.25	-.25	-.22	-.25	-.28	-.34	-.40	-.43
.45	-.19	-.19	-.13	-.13	-.13	-.13	-.10	-.16	-.13	-.23	-.26	-.26
.60	-.13	-.13	-.10	-.06	-.10	-.06	-.06	-.13	-.13	-.17	-.17	-.24
.75	-.05	-.05	-.05	-.02	-.05	-.05	-.05	-.08	-.11	-.11	-.14	-.17
.90	6.21	-.02	0.00	0.00	-.02	0.00	-.02	-.02	-.02	-.04	-.04	-.07
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 28 K = .2695 DELT AA = 4.12 MEAN AA = -.20

UPPER SURFACE

AA / X/C	-.19	-1.26	-2.25	-3.11	-3.76	-4.17	-4.31	-4.18	-3.76	-3.11	-2.26	-1.26
.00	.93	.88	.81	.67	.52	.36	.31	.26	.33	.43	.57	.76
.01	.77	.93	1.00	1.06	1.06	1.06	1.06	1.06	1.00	1.03	1.00	.97
.02	-.16	-.01	.19	.30	.37	.44	.41	.37	.37	.26	.16	.05
.05	-.77	-.58	-.40	-.34	-.30	-.18	-.21	-.21	-.30	-.40	-.49	-.64
.10	-.36	-.25	-.15	-.07	0.00	0.00	-.11	0.00	-.04	-.15	-.18	-.25
.15												
.20	-.33	-.23	-.17	-.11	-.08	-.08	-.14	-.14	-.17	-.20	-.27	-.33
.25	-.33	-.27	-.22	-.16	-.19	-.13	-.13	-.19	-.22	-.24	-.30	-.36
.35	-.17	-.17	-.11	-.11	-.11	-.08	-.11	-.11	-.17	-.17	-.24	-.27
.45	-.19	-.12	-.09	-.09	-.09	-.05	-.09	-.16	-.19	-.23	-.26	-.30
.60	-.18	-.11	-.11	-.08	-.04	-.08	-.11	-.14	-.14	-.18	-.24	-.21
.75	-.10	-.10	-.05	-.10	-.05	-.10	-.18	-.18	-.18	-.18	-.22	-.26
.90	.03	.06	.06	.06	.06	.06	.09	0.00	0.00	.03	0.00	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

AA / X/C	-.19	-1.26	-2.25	-3.11	-3.76	-4.17	-4.31	-4.18	-3.76	-3.11	-2.26	-1.26
.00	.93	.88	.81	.67	.52	.36	.31	.26	.33	.43	.57	.76
.01	.46	.24	-.03	-.30	-.58	-.80	-.86	-.92	-.83	-.67	-.40	-.09
.02	-.01	-.23	-.53	-.75	-.97	-1.16	-1.20	-1.23	-1.12	-1.01	-.79	-.53
.05	-.36	-.55	-.73	-.85	-.99	-1.07	-1.11	-1.07	-1.03	-.96	-.88	-.70
.10	-.52	-.59	-.72	-.82	-.88	-.88	-.95	-.95	-.91	-.85	-.75	-.62
.15	-.57	-.67	-.70	-.77	-.80	-.83	-.87	-.90	-.87	-.83	-.70	-.67
.20	-.67	-.70	-.80	-.80	-.83	-.86	-.86	-.86	-.86	-.83	-.80	-.70
.25	-.49	-.57	-.60	-.60	-.65	-.63	-.63	-.63	-.60	-.57	-.54	-.49
.35	-.46	-.48	-.51	-.51	-.51	-.54	-.51	-.54	-.51	-.51	-.46	-.40
.45	-.29	-.35	-.35	-.35	-.35	-.32	-.32	-.29	-.29	-.29	-.26	-.23
.60	-.24	-.21	-.28	-.21	-.24	-.21	-.21	-.21	-.21	-.17	-.21	-.13
.75	-.14	-.20	-.14	-.14	-.11	-.11	-.11	-.11	-.11	-.08	-.08	-.05
.90	-.07	-.07	-.02	-.02	-.02	0.00	0.00	-.02	-.02	0.00	-.02	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 49 K = .0318 DELT AA = 6.02 MEAN AA = -.20

AA X/C	-.20	1.35	2.80	4.05	5.01	5.61	5.81	5.61	5.01	4.05	2.81	1.35
UPPER SURFACE												
.00	.90	.92	.88	.64	.42	.20	.15	.23	.42	.68	.88	.95
.01	.68	.19	-.48	-1.31	-2.14	-2.77	-2.87	-2.67	-2.33	-1.55	-.82	-.19
.02	.23	-.15	-.58	-1.08	-1.44	-1.79	-1.79	-1.76	-1.54	-1.15	-.79	-.36
.05	-.20	-.56	-.83	-1.11	-1.05	-1.57	-1.60	-1.57	-1.50	-1.20	-.93	-.68
.10	-.24	-.49	-.67	-.84	-1.06	-1.13	-1.13	-1.09	-1.09	-.88	-.74	-.56
.15	.08	0.00	.05	-.17	-.20	-.23	-.20	-.23	-.20	-.17	-.17	-.07
.20	-.35	-.50	-.69	-.60	-.82	-.88	-.92	-.95	-.85	-.79	-.69	-.57
.25	-.36	-.53	-.59	-.62	-.73	-.76	-.79	-.76	-.76	-.70	-.64	-.53
.35	-.37	-.44	-.53	-.63	-.66	-.66	-.73	-.63	-.66	-.56	-.50	-.47
.45	-.26	-.36	-.40	-.43	-.50	-.53	-.53	-.60	-.60	-.50	-.43	-.12
.60	-.24	-.27	-.34	-.37	-.40	-.44	-.44	-.40	-.44	-.40	-.37	-.34
.75	-.18	.13	-.22	-.22	-.22	-.26	-.33	-.26	-.29	-.26	-.26	-.26
.90	-.05	-.02	-.02	-.02	-.08	-.05	-.05	-.08	-.08	-.05	-.08	-.05
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE												
.00	.90	.92	.88	.64	.42	.20	.15	.23	.42	.68	.88	.95
.01	.33	.70	.89	.92	.95	.98	.98	.95	.98	.98	.89	.64
.02	-.18	.21	.53	.65	.85	.89	.89	.89	.81	.65	.45	.13
.05	-.50	-.20	.05	.16	.31	.39	.42	.39	.31	.16	-.05	-.24
.10	-.51	-.32	-.12	-.03	.06	.13	.16	.13	.03	-.03	-.19	-.35
.15	-.46	-.33	-.17	-.10	0.00	.02	.05	.02	0.00	-.14	-.23	-.36
.20	-.39	-.26	-.17	-.07	-.04	.05	.05	.05	-.04	-.10	-.20	-.33
.25	-.43	-.35	-.24	-.15	-.10	-.07	-.04	-.04	-.12	-.21	-.29	-.40
.35	-.37	-.31	-.22	-.19	-.13	-.10	-.10	-.10	-.16	-.22	-.25	-.37
.45	-.34	-.27	-.21	-.21	-.15	-.08	-.08	-.15	-.15	-.18	-.27	-.34
.60	-.15	-.15	-.08	-.04	-.04	0.00	-.04	-.04	-.04	-.08	-.11	-.15
.75	-.11	-.09	-.06	-.09	-.03	-.03	-.03	-.06	-.06	-.06	-.09	-.14
.90	0.00	0.00	0.00	0.00	.02	.04	.02	.02	.02	.02	.02	-.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 49   K = .0318   DELT AA = 6.02   MEAN AA = -.20

AA X/C	-.19	-1.75	-3.20	-4.45	-5.41	-6.01	-6.21	-6.01	-5.41	-4.45	-3.21	-1.76
UPPER SURFACE												
.00	.90	.71	.35	-.0C	-.51	-.85	-.94	-.85	-.51	-.08	.39	.76
.01	.29	.68	.77	.77	.63	.58	.53	.53	.63	.63	.73	.82
.02	-.04	.27	.56	1.20	1.20	.88	.88	.88	.88	.74	.63	.41
.05	-.41	-.13	.10	.28	.43	.74	.53	.53	.46	.31	.13	-.07
.10	-.38	-.24	-.03	.07	.35	.35	.21	.21	.21	.07	0.00	-.14
.15	.02	.08	.15	.18	.25	.31	.35	.31	.25	.25	.18	.38
.20	-.38	-.35	-.22	-.09	-.06	.09	.02	0.00	-.03	-.12	-.19	-.28
.25	-.38	-.33	-.27	-.15	-.12	-.04	-.01	-.04	-.07	-.12	-.21	-.30
.35	-.37	-.34	-.24	-.15	-.15	-.08	-.08	-.11	-.11	-.18	-.24	-.27
.45	-.19	-.30	-.19	-.19	-.16	-.09	-.12	-.12	-.16	-.19	-.23	-.23
.60	-.27	-.27	-.24	-.17	-.17	-.14	-.14	-.14	-.17	-.20	-.20	-.20
.75	-.18	-.18	-.26	-.11	-.15	-.15	-.08	-.08	-.11	-.11	-.15	-.15
.90	-.05	-.05	-.02	-.02	-.05	-.05	-.05	-.05	-.02	-.05	-.05	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.90	.71	.35	-.08	-.51	-.85	-.94	-.85	-.51	-.08	.39	.76
.01	.30	-.25	-.84	-1.49	-2.01	-2.41	-2.54	-2.44	-2.04	-1.42	-.74	-.09
.02	-.26	-.73	-1.17	-1.73	-2.09	-2.40	-2.52	-2.40	-2.09	-1.69	-1.13	-.61
.05	-.50	-.83	-1.13	-1.42	-1.68	-1.72	-1.72	-1.79	-1.65	-1.35	-1.09	-.72
.10	-.55	-.77	-.94	-1.13	-1.26	-1.33	-1.36	-1.29	-1.20	-1.10	-.94	-.68
.15	-.50	-.66	-.82	-.89	-1.02	-1.05	-1.12	-1.09	-.95	-.89	-.76	-.59
.20	-.42	-.55	-.68	-.74	-.84	-.84	-.90	-.84	-.81	-.68	-.61	-.49
.25	-.48	-.59	-.68	-.73	-.84	-.87	-.87	-.84	-.79	-.73	-.65	-.51
.35	-.40	-.49	-.55	-.61	-.67	-.70	-.70	-.70	-.64	-.61	-.52	-.43
.45	-.37	-.44	-.47	-.50	-.56	-.60	-.56	-.56	-.53	-.50	-.44	-.37
.60	-.19	-.22	-.26	-.22	-.33	-.33	-.30	-.30	-.26	-.22	-.22	-.19
.75	-.14	-.14	-.14	-.17	-.20	-.20	-.20	-.20	-.17	-.14	-.14	-.09
.90	-.03	0.00	0.00	0.00	-.03	-.03	0.00	-.03	0.00	0.00	0.00	.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 50   K = .0494   DELT AA = 6.03   MEAN AA = -.20

AA X/C	-.20	1.36	2.81	4.06	5.02	5.62	5.82	5.62	5.02	4.06	2.81	1.36
UPPER SURFACE												
.00	.95	.97	.88	.66	.44	.27	.18	.25	.42	.71	.90	1.00
.01	.63	.14	-.43	-1.21	-1.94	-2.53	-2.67	-2.58	-2.14	-1.60	-.77	.04
.02	.20	-.18	-.61	-1.01	-1.36	-1.65	-1.72	-1.65	-1.47	-1.19	-.72	-.26
.05	-.23	-.56	-.80	-1.05	-1.35	-1.47	-1.54	-1.47	-1.41	-1.20	-.99	-.56
.10	-.21	-.46	-.56	-.74	-.95	-1.02	-1.06	-1.06	-.99	-.88	-.67	-.49
.15	.12	.05	-.04	-.07	-.14	-.20	-.20	-.20	-.17	-.14	-.07	.02
.20	-.35	-.47	-.60	-.73	-.79	-.82	-.85	-.82	-.82	-.73	-.60	-.50
.25	-.36	-.47	-.53	-.64	-.64	-.70	-.70	-.70	-.67	-.64	-.56	-.44
.35	-.31	-.34	-.40	-.50	-.53	-.60	-.56	-.56	-.60	-.60	-.47	-.40
.45	-.26	-.30	-.33	-.40	-.43	-.43	-.47	-.47	-.47	-.43	-.36	-.33
.60	-.20	-.24	-.27	-.34	-.34	-.40	-.34	-.34	-.37	-.30	-.30	-.24
.75	-.15	-.11	-.15	-.18	-.18	-.22	-.22	-.18	-.22	-.18	-.18	-.15
.90	-.02	-.02	-.02	-.02	-.02	-.05	-.02	0.00	-.05	0.00	-.02	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.95	.97	.88	.66	.44	.27	.18	.25	.42	.71	.90	1.00
.01	.36	.67	.89	.95	.98	.98	.98	1.01	.98	.98	.89	.70
.02	-.14	.21	.49	.73	.81	.93	.93	.93	.85	.69	.45	.21
.05	-.42	-.16	.01	.24	.39	.46	.46	.46	.35	.24	.01	-.16
.10	-.48	-.29	-.16	0.00	.13	.16	.22	.13	.06	0.00	-.16	-.32
.15	-.43	-.30	-.20	-.07	0.00	.08	.08	.08	0.00	-.07	-.20	-.30
.20	-.36	-.23	-.14	-.04	.01	.05	.08	.05	-.01	-.07	-.17	-.26
.25	-.37	-.29	-.24	-.12	-.07	-.04	-.04	-.04	-.12	-.18	-.26	-.35
.35	-.34	-.25	-.22	-.13	-.10	-.07	-.05	-.07	-.10	-.16	-.22	-.28
.45	-.31	-.24	-.18	-.15	-.08	-.08	-.08	-.08	-.15	-.18	-.24	-.27
.60	-.08	-.04	-.04	0.00	.02	.02	.02	.02	-.04	-.04	-.08	-.08
.75	-.06	-.03	-.03	-.03	-.03	0.00	.02	0.00	-.03	-.06	-.06	-.06
.90	.04	.07	.02	.04	.04	.07	.07	.04	.02	.02	.02	.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 50 K = .0494 DELT AA = 6.03 MEAN AA = -.20

UPPER SURFACE

AA X/C	-.19	-1.75	-3.21	-4.46	-5.42	-6.02	-6.22	-6.02	-5.42	-4.46	-3.21	-1.76
.00	.90	.73	.37	-.05	-.49	-.77	-.92	-.80	-.51	-.05	.37	.73
.01	.48	.73	.87	.82	.77	.68	.63	.63	.73	.82	.87	.82
.02	.09	.34	.63	.81	.88	.91	.95	.95	.91	.88	.70	.52
.05	-.29	-.07	.16	.34	.43	.53	.56	.56	.49	.40	.22	.04
.10	-.31	-.17	0.00	.14	.21	.21	.28	.28	.28	.17	.07	-.07
.15	.08	.12	.21	.28	.31	.31	.38	.38	.35	.28	.25	.18
.20	-.38	-.28	-.19	-.06	0.00	0.00	.02	.06	.02	-.03	-.16	-.22
.25	-.36	-.27	-.21	-.12	-.07	-.04	-.01	.01	-.01	-.07	-.18	-.24
.35	-.34	-.24	-.21	-.05	-.08	-.05	-.05	-.02	-.02	-.08	-.15	-.24
.45	-.30	-.23	-.16	-.12	-.09	-.06	-.09	-.06	-.09	-.09	-.16	-.23
.60	-.24	-.20	-.17	-.10	-.10	-.10	-.07	-.10	-.10	-.10	-.17	-.17
.75	-.11	-.11	-.11	-.08	-.08	-.08	-.08	-.04	-.08	-.08	-.11	-.11
.90	-.02	-.05	0.00	.03	0.00	0.00	0.00	.03	0.00	0.00	0.00	.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

X/C	-.19	-1.75	-3.21	-4.46	-5.42	-6.02	-6.22	-6.02	-5.42	-4.46	-3.21	-1.76
.00	.90	.73	.37	-.05	-.49	-.77	-.92	-.80	-.51	-.05	.37	.73
.01	.27	-.25	-.80	-1.45	-1.98	-2.38	-2.54	-2.35	-1.98	-1.42	-.80	-.19
.02	-.26	-.69	-1.17	-1.65	-2.05	-2.32	-2.48	-2.32	-2.05	-1.61	-1.17	-.65
.05	-.50	-.79	-1.09	-1.35	-1.61	-1.68	-1.72	-1.68	-1.61	-1.35	-1.09	-.76
.10	-.55	-.74	-.94	-1.13	-1.16	-1.29	-1.33	-1.29	-1.16	-1.07	-.90	-.71
.15	-.46	-.66	-.76	-.92	-.99	-1.05	-1.05	-1.02	-.92	-.82	-.76	-.59
.20	-.42	-.52	-.65	-.71	-.81	-.84	-.87	-.81	-.74	-.65	-.58	-.52
.25	-.46	-.59	-.65	-.73	-.82	-.82	-.87	-.82	-.76	-.70	-.59	-.54
.35	-.40	-.49	-.52	-.61	-.61	-.70	-.67	-.61	-.61	-.52	-.49	-.43
.45	-.37	-.44	-.44	-.50	-.53	-.56	-.53	-.50	-.50	-.44	-.40	-.37
.60	-.15	-.22	-.19	-.22	-.26	-.30	-.30	-.22	-.22	-.15	-.19	-.15
.75	-.11	-.14	-.14	-.14	-.17	-.20	-.17	-.14	-.14	-.09	-.14	-.09
.90	0.00	0.00	.02	0.00	0.00	0.00	-.03	.02	.02	.02	.02	.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 51 K = .0749 DELT AA = 6.04 MEAN AA = -.20

AA X/C	-.20	1.36	2.81	4.07	5.03	5.63	5.83	5.63	5.03	4.07	2.82	1.36
UPPER SURFACE												
.00	.92	.97	.92	.73	.54	.30	.20	.23	.42	.66	.80	.95
.01	.63	.09	-.58	-1.31	-1.99	-2.48	-2.77	-2.67	-2.38	-1.70	-1.02	-.29
.02	.20	-.22	-.65	-1.08	-1.40	-1.65	-1.76	-1.79	-1.58	-1.26	-.90	-.51
.05	-.20	-.56	-.90	-1.17	-1.38	-1.54	-1.60	-1.63	-1.50	-1.26	-1.05	-.71
.10	-.24	-.49	-.67	-.88	-1.02	-1.09	-1.16	-1.16	-1.09	-.95	-.81	-.63
.15	.08	-.04	-.10	-.17	-.23	-.23	-.27	-.23	-.23	-.20	-.17	-.07
.20	-.35	-.54	-.69	-.79	-.82	-.95	-.92	-.92	-.85	-.79	-.76	-.57
.25	-.36	-.50	-.64	-.70	-.70	-.79	-.79	-.79	-.76	-.67	-.64	-.56
.35	-.31	-.44	-.56	-.60	-.66	-.66	-.69	-.69	-.63	-.60	-.53	-.47
.45	-.30	-.40	-.47	-.53	-.50	-.53	-.57	-.53	-.53	-.47	-.47	-.40
.60	-.27	-.37	-.40	-.44	-.44	-.40	-.54	-.47	-.44	-.44	-.40	-.37
.75	-.18	-.26	-.29	-.29	-.29	-.29	-.33	-.29	-.33	-.29	-.26	-.22
.90	-.02	-.11	-.11	-.11	-.08	-.11	-.08	-.08	-.08	-.11	-.08	-.08
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.92	.97	.92	.73	.54	.30	.20	.23	.42	.66	.80	.95
.01	.27	.67	.82	.95	1.01	.98	.98	.98	.98	.98	.95	.79
.02	-.26	.13	.41	.65	.85	.93	.97	.93	.85	.73	.57	.29
.05	-.50	-.24	-.01	.16	.35	.42	.42	.42	.39	.24	.09	-.09
.10	-.51	-.32	-.19	-.06	.39	.13	.13	.16	.09	0.00	-.12	-.29
.15	-.46	-.30	-.20	-.07	0.00	.05	.05	.05	.02	-.07	-.17	-.23
.20	-.39	-.23	-.17	-.10	.01	.01	.05	-.01	-.01	-.04	-.14	-.23
.25	-.40	-.32	-.26	-.21	-.10	-.07	-.07	-.04	-.07	-.12	-.24	-.35
.35	-.34	-.25	-.22	-.16	-.10	-.10	-.10	-.07	-.13	-.16	-.22	-.31
.45	-.27	-.24	-.21	-.15	-.11	-.08	-.08	-.11	-.11	-.18	-.27	-.24
.60	-.08	-.08	0.00	-.04	0.00	.02	.06	0.00	0.00	-.04	-.04	-.04
.75	-.06	-.06	-.03	-.03	0.00	0.00	0.00	.02	0.00	-.06	-.06	-.06
.90	.04	.04	.04	.02	.04	.04	.04	.02	.02	.02	.02	.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 51 K = .0749 DELT AA = 6.04 MEAN AA = -.20

AA X/C	-.19	-1.76	-3.21	-4.46	-5.42	-6.03	-6.23	-6.03	-5.43	-4.47	-3.22	-1.76
						UPPER SURFACE						
.00	.97	.83	.49	0.00	-.39	-.73	-.85	-.77	-.56	-.17	.27	.71
.01	.29	.63	.73	.73	.63	.58	.48	.43	.63	.73	.77	.77
.02	-.08	.27	.49	.66	.77	.84	.88	.88	.84	.77	.66	.45
.05	-.44	-.26	.04	.19	.34	.43	.46	.49	.46	.31	.19	-.04
.10	-.42	-.24	-.10	0.00	.10	.14	.17	.17	.17	.07	-.03	-.14
.15	-.04	.05	.15	.15	.21	.28	.28	.28	.25	.25	.18	.08
.20	-.47	-.35	-.25	-.19	-.12	-.03	-.03	-.03	-.06	-.12	-.22	-.31
.25	-.44	-.36	-.27	-.21	-.15	-.12	-.12	-.07	-.10	-.15	-.24	-.30
.35	-.40	-.31	-.31	-.21	-.15	-.11	-.15	-.11	-.11	-.18	-.21	-.31
.45	-.43	-.30	-.26	-.26	-.19	-.19	-.19	-.09	-.16	-.19	-.23	-.33
.60	-.27	-.27	-.27	-.24	-.24	-.20	-.17	-.17	-.17	-.20	-.24	-.27
.75	-.22	-.18	-.18	-.18	-.18	-.15	-.15	-.11	-.15	-.15	-.18	-.22
.90	-.05	-.05	-.08	-.05	-.08	-.08	-.05	-.05	-.05	-.08	-.05	-.05
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	.97	.83	.49	0.00	-.39	-.73	-.85	-.77	-.56	[illegible]	.27	.71
.01	.42	-.09	-.62	-1.33	-1.89	-2.29	-2.44	-2.38	-2.01	[illegible]	-.90	-.22
.02	-.06	-.54	-1.05	-1.61	-2.01	-2.29	-2.52	-2.36	-2.13	[illegible]	-1.21	-.73
.05	-.35	-.61	-.94	-1.31	-1.57	-1.72	-1.72	-1.65	-1.53	-1.39	-1.13	-.79
.10	-.48	-.64	-.87	-1.10	-1.16	-1.26	-1.29	-1.26	-1.20	-1.10	-.94	-.74
.15	-.36	-.56	-.72	-.89	-.99	-1.05	-1.05	-1.02	-.92	-.86	-.76	-.66
.20	-.33	-.45	-.58	-.74	-.81	-.84	-.90	-.81	-.77	-.74	-.61	-.52
.25	-.35	-.51	-.65	-.73	-.79	-.84	-.87	-.82	-.62	-.70	-.59	-.54
.35	-.34	-.46	-.52	-.61	-.64	-.67	-.70	-.64	-.64	-.55	-.52	-.46
.45	-.34	-.40	-.44	-.50	-.53	-.56	-.56	-.50	-.47	-.47	-.40	-.31
.60	-.15	-.19	-.19	-.22	-.26	-.30	-.30	-.22	-.22	-.19	-.15	-.11
.75	-.06	-.11	-.14	-.14	-.20	-.20	-.17	-.14	-.11	-.14	-.09	-.09
.90	.04	.02	.02	.02	-.03	.02	.02	.02	.02	.02	.02	.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 52 K = .1004 DELT AA = 6.06 MEAN AA = -.20

AA / X/C	-.20	1.36	2.82	4.08	5.04	5.65	5.85	5.65	5.04	4.08	2.83	1.36
UPPER SURFACE												
.00	.85	.92	.92	.80	.54	.35	.23	.23	.39	.56	.80	.92
.01	.68	.29	-.29	-1.11	-1.75	-2.24	-2.58	-2.53	-2.24	-1.75	-1.02	-.24
.02	.23	-.11	-.54	-.93	-1.29	-1.54	-1.65	-1.65	-1.54	-1.26	-.86	-.51
.05	-.23	-.53	-.77	-1.11	-1.47	-1.47	-1.57	-1.57	-1.47	-1.29	-1.05	-.77
.10	-.24	-.38	-.56	-.74	-.88	-.99	-1.09	-1.06	-.95	-.88	-.74	-.53
.15	.12	.05	-.04	-.10	-.14	-.14	-.17	-.20	-.14	-.14	-.07	-.04
.20	-.35	-.44	-.60	-.66	-.85	-.79	-.82	-.85	-.82	-.76	-.66	-.50
.25	-.33	-.41	-.50	-.59	-.62	-.67	-.67	-.67	-.64	-.62	-.53	-.47
.35	-.27	-.37	-.40	-.44	-.50	-.53	-.56	-.56	-.53	-.50	-.47	-.37
.45	-.23	-.30	-.33	-.36	-.36	-.43	-.43	-.47	-.40	-.40	-.33	-.26
.60	-.24	-.27	-.27	-.30	-.30	-.37	-.37	-.40	-.34	-.34	-.27	-.27
.75	-.15	-.15	-.18	-.22	-.29	-.26	-.22	-.18	-.15	-.22	-.15	-.15
.90	.03	0.00	0.00	0.00	.06	.03	.03	.03	.03	.03	.03	.09
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.85	.92	.92	.80	.54	.35	.23	.23	.39	.56	.80	.92
.01	.14	.55	.79	.89	.92	.92	.89	.92	.92	.92	.86	.73
.02	-.34	.01	.33	.57	.73	.77	.77	.81	.77	.65	.49	.25
.05	-.61	-.31	-.09	.05	.20	.31	.35	.31	.24	.13	-.01	-.16
.10	-.58	-.38	-.22	-.09	.03	.06	.09	.09	.03	-.03	-.16	-.32
.15	-.50	-.36	-.23	-.14	-.04	0.00	-.04	-.04	-.04	-.10	-.20	-.33
.20	-.49	-.33	-.20	-.14	-.04	-.04	-.04	-.04	-.07	-.17	-.20	-.29
.25	-.48	-.37	-.29	-.24	-.15	-.12	-.12	-.12	-.18	-.24	-.29	-.40
.35	-.37	-.31	-.22	-.19	-.16	-.13	-.10	-.13	-.16	-.19	-.25	-.34
.45	-.34	-.27	-.21	-.21	-.18	-.15	-.11	-.15	-.21	-.24	-.31	-.34
.60	-.19	-.15	-.11	-.11	-.08	-.08	-.11	-.11	-.11	-.15	-.22	-.22
.75	-.14	-.11	-.09	-.09	-.11	-.09	-.09	-.09	-.11	-.11	-.11	-.11
.90	-.03	0.00	.02	-.03	-.03	-.03	-.03	-.03	-.03	-.06	-.06	-.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 52 K = .1004 DELT AA = 6.06 MEAN AA = -.20

AA / X/C	-.19	-1.76	-3.22	-4.48	-5.44	-6.05	-6.25	-6.05	-5.44	-4.48	-3.23	-1.77
UPPER SURFACE												
.00	.92	.80	.49	.11	-.32	-.63	-.80	-.58	-.22	.23	.59	.85
.01	.29	.68	.87	.82	.82	.68	.63	.68	.77	.82	.87	.73
.02	-.11	.23	.52	.70	.84	.88	.88	.84	.81	.70	.56	.27
.05	-.50	-.17	.01	.22	.34	.43	.46	.40	.34	.22	.04	-.20
.10	-.38	-.14	-.03	.10	.21	.28	.28	.24	.21	.07	.03	-.17
.15	.05	.12	.21	.25	.31	.38	.38	.31	.31	.25	.15	.12
.20	-.41	-.28	-.19	-.09	-.03	.02	.06	0.00	-.06	-.12	-.22	-.31
.25	-.36	-.24	-.18	-.10	-.04	-.01	.04	-.04	-.10	-.15	-.21	-.30
.35	-.31	-.21	-.11	-.08	-.02	-.02	-.02	-.05	-.08	-.11	-.18	-.27
.45	-.19	-.19	-.12	-.09	-.02	-.06	-.02	-.06	-.12	-.12	-.16	-.23
.60	-.24	-.17	-.14	-.10	-.07	-.03	-.10	-.10	-.14	-.14	-.17	-.20
.75	-.08	-.08	-.08	-.04	-.04	-.04	-.08	-.11	-.08	-.11	-.15	-.22
.90	.09	.09	.09	.09	.09	.09	.06	.03	.03	.03	.06	.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.92	.80	.49	.11	-.32	-.63	-.80	-.58	-.22	.23	.59	.85
.01	.45	0.00	-.65	-1.21	-1.73	-2.17	-2.41	-2.07	-1.61	-.93	-.43	.14
.02	-.10	-.46	-1.05	-1.53	-1.93	-2.32	-2.44	-2.21	-1.81	-1.33	-.89	-.38
.05	-.38	-.72	-1.02	-1.31	-1.53	-1.76	-1.79	-1.72	-1.50	-1.16	-.87	-.57
.10	-.48	-.71	-.87	-1.03	-1.16	-1.23	-1.33	-1.26	-1.13	-1.00	-.81	-.61
.15	-.43	-.59	-.76	-.89	-.95	-1.02	-1.09	-1.02	-.92	-.79	-.69	-.53
.20	-.42	-.52	-.65	-.74	-.81	-.87	-.90	-.87	-.74	-.65	-.58	-.45
.25	-.46	-.59	-.68	-.73	-.79	-.87	-.90	-.82	-.76	-.65	-.57	-.48
.35	-.40	-.46	-.55	-.61	-.64	-.67	-.70	-.64	-.61	-.49	-.43	-.37
.45	-.37	-.40	-.47	-.50	-.53	-.56	-.60	-.50	-.50	-.40	-.37	-.31
.60	-.22	-.22	-.30	-.30	-.33	-.33	-.41	-.30	-.30	-.22	-.19	-.15
.75	-.14	-.17	-.14	-.20	-.20	-.26	-.26	-.20	-.20	-.11	-.14	-.11
.90	-.03	-.03	-.06	-.06	-.06	-.09	-.06	-.06	-.03	-.03	0.00	-.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 53 K = .1275 DELT AA = 6.07 MEAN AA = -.20

UPPER SURFACE

AA / X/C	-.20	1.37	2.83	4.09	5.05	5.66	5.86	5.66	5.05	4.09	2.83	1.37
.00	.78	.88	.90	.80	.61	.39	.27	.25	.35	.49	.68	.92
.01	.63	.29	-.34	-.87	-1.70	-2.24	-2.43	-2.33	-1.99	-1.36	-.68	0.00
.02	.16	-.15	-.54	-.86	-1.26	-1.51	-1.65	-1.61	-1.40	-1.11	-.79	-.29
.05	-.29	-.56	-.83	-1.05	-1.32	-1.47	-1.54	-1.50	-1.38	-1.17	-.96	-.68
.10	-.28	-.42	-.60	-.74	-.92	-.99	-1.02	-1.06	-.99	-.84	-.67	-.46
.15	.05	.02	-.07	-.10	-.14	-.20	-.20	-.20	-.20	-.17	-.07	0.00
.20	-.35	-.50	-.60	-.66	-.76	-.79	-.85	-.82	-.79	-.73	-.60	-.47
.25	-.36	-.44	-.53	-.53	-.62	-.67	-.67	-.73	-.59	-.59	-.53	-.41
.35	-.34	-.40	-.44	-.47	-.53	-.56	-.60	-.56	-.53	-.47	-.44	-.34
.45	-.26	-.30	-.40	-.36	-.40	-.43	-.47	-.40	-.43	-.36	-.33	-.23
.60	-.27	-.30	-.30	-.34	-.34	-.37	-.37	-.37	-.34	-.34	-.27	-.24
.75	-.22	-.15	-.22	-.18	-.22	-.26	-.26	-.22	-.22	-.18	-.15	-.15
.90	.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.03	.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

X/C	-.20	1.37	2.83	4.09	5.05	5.66	5.86	5.66	5.05	4.09	2.83	1.37
.00	.78	.88	.90	.80	.61	.39	.27	.25	.35	.49	.68	.92
.01	.05	.36	.73	.86	.92	.92	.92	.92	.92	.92	.86	.76
.02	-.54	-.18	.21	.41	.69	.77	.77	.77	.73	.65	.45	.29
.05	-.68	-.42	-.16	.01	.16	.27	.27	.31	.24	.16	.01	-.16
.10	-.61	-.48	-.29	-.09	0.00	.06	.09	.09	0.00	-.03	-.12	-.25
.15	-.56	-.43	-.27	-.14	-.07	-.04	-.04	-.04	-.07	-.07	-.20	-.30
.20	-.45	-.36	-.26	-.17	-.07	-.07	-.07	-.04	-.07	-.10	-.20	-.33
.25	-.48	-.40	-.29	-.26	-.12	-.12	-.15	-.15	-.18	-.21	-.32	-.35
.35	-.40	-.34	-.28	-.19	-.16	-.16	-.13	-.19	-.19	-.22	-.28	-.13
.45	-.34	-.31	-.24	-.21	-.15	-.15	-.21	-.21	-.18	-.21	-.27	-.18
.60	-.19	-.15	-.11	-.11	-.11	-.08	-.11	-.15	-.15	-.19	-.19	-.22
.75	-.14	-.11	-.11	-.09	-.09	-.11	-.09	-.11	-.11	-.11	-.14	-.20
.90	-.03	-.03	0.00	0.00	-.03	-.03	-.03	-.06	-.03	-.06	-.06	-.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 53 K = .1275 DELT AA = 6.07 MEAN AA = -.20

UPPER SURFACE

AA / X/C	-.19	-1.76	-3.23	-4.49	-5.45	-6.06	-6.26	-6.06	-5.45	-4.49	-3.23	-1.77
.00	.90	.88	.64	.20	-.17	-.53	-.61	-.77	-.63	-.22	.11	.54
.01	.48	.77	.82	.63	.73	.63	.53	.63	.68	.77	.77	.77
.02	.06	.41	.56	.70	.81	.84	.84	.84	.84	.70	.63	.45
.05	-.38	-.10	.04	.22	.34	.40	.43	.40	.34	.22	.07	-.07
.10	-.24	-.10	0.00	.07	.14	.24	.17	.21	.14	.07	-.03	-.16
.15	.05	.12	.18	.21	.28	.28	.31	.31	.25	.21	.16	.15
.20	-.35	-.25	-.19	-.12	-.03	-.03	0.00	-.03	-.06	-.16	-.19	-.28
.25	-.33	-.21	-.18	-.12	-.07	-.04	-.04	-.07	-.10	-.12	-.21	-.27
.35	-.27	-.18	-.18	-.11	-.05	-.05	-.05	-.11	-.11	-.15	-.21	-.24
.45	-.19	-.16	-.19	-.12	-.09	-.09	-.09	-.12	-.16	-.16	-.19	-.23
.60	-.24	-.17	-.17	-.10	-.14	-.10	-.14	-.17	-.17	-.17	-.20	-.27
.75	-.08	-.08	-.15	-.08	-.08	-.11	-.15	-.15	-.15	-.15	-.15	-.15
.90	.06	.06	.03	.06	.03	0.00	.03	.03	0.00	0.00	0.00	.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

X/C	-.19	-1.76	-3.23	-4.49	-5.45	-6.06	-6.26	-6.06	-5.45	-4.49	-3.23	-1.77
.00	.90	.88	.64	.20	-.17	-.53	-.61	-.77	-.63	-.22	.11	.54
.01	.45	.08	-.40	-.93	-1.61	-2.01	-2.17	-2.32	-2.17	-1.67	-1.15	-.46
.02	-.06	-.42	-.85	-1.33	-1.85	-2.13	-2.25	-2.36	-2.25	-1.89	-1.49	-.97
.05	-.38	-.64	-.94	-1.31	-1.50	-1.68	-1.76	-1.79	-1.72	-1.50	-1.24	-.94
.10	-.45	-.61	-.84	-1.07	-1.20	-1.23	-1.26	-1.29	-1.23	-1.16	-1.03	-.81
.15	-.43	-.56	-.72	-.82	-.95	-.99	-1.02	-1.09	-1.02	-.92	-.86	-.69
.20	-.42	-.49	-.65	-.74	-.81	-.87	-.87	-.90	-.90	-.77	-.68	-.65
.25	-.46	-.54	-.68	-.79	-.79	-.87	-.84	-.90	-.84	-.79	-.70	-.59
.35	-.40	-.46	-.55	-.61	-.70	-.67	-.70	-.67	-.64	-.61	-.55	-.43
.45	-.37	-.44	-.50	-.53	-.50	-.56	-.60	-.60	-.53	-.50	-.44	-.37
.60	-.30	-.30	-.30	-.33	-.37	-.33	-.37	-.41	-.33	-.33	-.30	-.22
.75	-.17	-.09	-.20	-.26	-.26	-.23	-.26	-.26	-.23	-.23	-.17	-.14
.90	-.06	-.03	-.09	-.09	-.06	-.06	-.12	-.09	-.12	-.06	-.03	-.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 54 K = .1562 DELT AA = 6.09 MEAN AA = -.20

AA / X/C	-.20	1.37	2.84	4.10	5.07	5.68	5.88	5.68	5.07	4.10	2.84	1.37
UPPER SURFACE												
.00	.83	.92	.88	.76	.64	.42	.32	.35	.44	.64	.83	.90
.01	.63	.24	-.48	-1.07	-1.65	-2.04	-2.28	-2.28	-1.94	-1.41	-.73	-.19
.02	.20	-.22	-.68	-1.01	-1.26	-1.58	-1.54	-1.54	-1.40	-1.11	-.76	-.40
.05	-.29	-.65	-.96	-1.11	-1.29	-1.44	-1.54	-1.47	-1.38	-1.17	-.93	-.68
.10	-.28	-.49	-.67	-.51	-.92	-.99	-1.02	-1.02	-.92	-.77	-.63	-.49
.15	.12	0.00	-.04	-.07	-.17	-.17	-.20	-.17	-.14	-.10	-.10	0.00
.20	-.41	-.54	-.63	-.73	-.79	-.79	-.82	-.79	-.76	-.66	-.57	-.50
.25	-.38	-.50	-.56	-.62	-.62	-.64	-.67	-.64	-.59	-.59	-.50	-.44
.35	-.37	-.44	-.50	-.53	-.50	-.53	-.56	-.56	-.50	-.50	-.40	-.34
.45	-.33	-.36	-.40	-.40	-.40	-.43	-.43	-.43	-.40	-.36	-.33	-.26
.60	-.30	-.34	-.34	-.37	-.37	-.37	-.37	-.37	-.30	-.27	-.27	-.24
.75	-.26	-.22	-.26	-.22	-.26	-.26	-.22	-.26	-.22	-.15	-.15	-.15
.90	-.02	0.00	0.00	0.00	.03	0.00	0.00	0.00	.03	.03	.03	.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.83	.92	.88	.76	.64	.42	.32	.35	.44	.64	.83	.90
.01	.05	.45	.76	.89	.92	.95	.92	.92	.92	.92	.86	.67
.02	-.46	-.06	.29	.53	.65	.73	.77	.77	.77	.65	.49	.21
.05	-.64	-.38	-.09	.05	.16	.27	.31	.35	.27	.16	.05	-.20
.10	-.58	-.42	-.25	-.09	0.00	.06	.09	.06	.03	-.03	-.12	-.32
.15	-.53	-.40	-.27	-.17	-.04	0.00	0.00	0.00	-.04	-.10	-.20	-.36
.20	-.49	-.36	-.26	-.14	-.07	-.01	-.04	-.04	-.07	-.14	-.20	-.33
.25	-.48	-.40	-.32	-.21	-.12	-.12	-.12	-.12	-.15	-.24	-.29	-.40
.35	-.37	-.34	-.25	-.16	-.13	-.13	-.13	-.13	-.16	-.22	-.31	-.37
.45	-.34	-.27	-.24	-.18	-.18	-.15	-.11	-.21	-.21	-.27	-.27	-.37
.60	-.15	-.15	-.15	-.11	-.04	-.08	-.08	-.11	-.08	-.15	-.22	-.22
.75	-.11	-.11	-.11	-.09	-.06	-.06	-.11	-.09	-.11	-.09	-.11	-.14
.90	-.03	0.00	0.00	.02	.02	0.00	0.00	-.03	0.00	-.03	-.03	-.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 54 K = .1562 DELT AA = 6.09 MEAN AA = -.20

AA X/C	-.19	-1.77	-3.24	-4.50	-5.47	-6.08	-6.28	-6.08	-5.47	-4.50	-3.24	-1.77
UPPER SURFACE												
.00	.92	.73	.52	.13	-.24	-.56	-.70	-.68	-.39	-.10	.32	.64
.01	.39	.68	.73	.77	.68	.68	.63	.68	.73	.73	.82	.82
.02	-.01	.23	.52	.66	.77	.84	.88	.77	.84	.77	.66	.45
.05	-.41	-.26	.01	.16	.28	.40	.40	.40	.37	.25	.13	-.10
.10	-.31	-.21	-.03	.07	.10	.21	.21	.21	.28	.14	0.00	-.14
.15	.08	.12	.18	.28	.35	.35	.35	.38	.41	.41	.38	.31
.20	-.38	-.25	-.19	-.16	-.06	-.03	-.03	0.00	-.06	-.09	-.19	-.28
.25	-.33	-.27	-.18	-.12	-.10	-.04	-.04	-.04	-.10	-.12	-.18	-.24
.35	-.27	-.24	-.18	-.11	-.15	-.08	-.05	-.05	-.11	-.15	-.18	-.24
.45	-.19	-.23	-.16	-.16	-.09	-.09	-.09	-.09	-.09	-.19	-.19	-.23
.60	-.27	-.17	-.14	-.14	-.14	-.14	-.14	-.14	-.14	-.17	-.17	-.24
.75	-.11	-.11	-.11	-.11	-.11	-.11	-.08	-.15	-.11	-.15	-.18	-.15
.90	.03	.03	.06	.09	.03	.03	.03	0.00	.03	.03	.03	.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.92	.73	.52	.13	-.24	-.56	-.70	-.68	-.39	-.10	.32	.64
.01	.33	-.06	-.65	-1.21	-1.70	-2.04	-2.23	-2.17	-1.89	-1.45	-.87	-.28
.02	-.18	-.58	-1.01	-1.49	-1.93	-2.17	-2.25	-2.25	-2.05	-1.65	-1.25	-.81
.05	-.46	-.76	-1.02	-1.31	-1.50	-1.68	-1.72	-1.72	-1.61	-1.35	-1.09	-.83
.10	-.55	-.68	-.87	-1.07	-1.20	-1.20	-1.23	-1.20	-1.16	-1.07	-.87	-.74
.15	-.46	-.63	-.72	-.86	-.95	-.99	-.99	-1.02	-.92	-.86	-.69	-.63
.20	-.45	-.58	-.68	-.77	-.81	-.84	-.84	-.87	-.81	-.71	-.58	-.52
.25	-.48	-.62	-.68	-.79	-.82	-.87	-.82	-.84	-.76	-.70	-.59	-.54
.35	-.43	-.55	-.58	-.64	-.67	-.67	-.64	-.64	-.61	-.55	-.49	-.37
.45	-.40	-.47	-.50	-.53	-.53	-.56	-.50	-.53	-.47	-.44	-.37	-.34
.60	-.26	-.30	-.30	-.37	-.37	-.37	-.33	-.30	-.30	-.22	-.19	-.15
.75	-.17	-.23	-.23	-.23	-.23	-.23	-.23	-.20	-.17	-.14	-.11	-.11
.90	-.06	-.06	-.06	-.09	-.06	-.03	-.03	-.06	-.03	0.00	0.00	.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 55 K = .1897 DELT AA = 6.11 MEAN AA = -.20

UPPER SURFACE

AA / X/C	-.20	1.38	2.85	4.12	5.09	5.70	5.90	5.70	5.09	4.12	2.85	1.38
.00	.83	.95	.92	.85	.66	.47	.35	.35	.47	.66	.83	.92
.01	.58	.24	-.38	-.87	-1.55	-2.09	-2.33	-2.33	-2.19	-1.65	-1.11	-.38
.02	.16	-.18	-.58	-.86	-1.19	-1.47	-1.58	-1.58	-1.47	-1.22	-.90	-.51
.05	-.29	-.53	-.83	-1.08	-1.26	-1.41	-1.50	-1.47	-1.41	-1.23	-1.11	-.74
.10	-.31	-.49	-.67	-.77	-.92	-1.02	-1.06	-1.06	-.99	-.92	-.88	-.63
.15												
.20	-.44	-.60	-.66	-.76	-.82	-.82	-.85	-.82	-.82	-.73	-.73	-.57
.25	-.47	-.56	-.62	-.67	-.73	-.70	-.76	-.73	-.73	-.67	-.62	-.56
.35	-.34	-.47	-.53	-.53	-.56	-.53	-.56	-.56	-.53	-.50	-.47	-.34
.45	-.33	-.40	-.43	-.47	-.47	-.47	-.50	-.47	-.43	-.40	-.40	-.33
.60	-.30	-.34	-.37	-.37	-.37	-.40	-.40	-.37	-.37	-.37	-.30	-.30
.75	-.22	-.26	-.22	-.22	-.26	-.26	-.26	-.22	-.22	-.18	-.18	-.18
.90	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.05	-.05	0.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

AA / X/C	-.20	1.38	2.85	4.12	5.09	5.70	5.90	5.70	5.09	4.12	2.85	1.38
.00	.83	.95	.92	.85	.66	.47	.35	.35	.47	.66	.83	.92
.01	.05	.45	.70	.89	.92	.92	.89	.92	.92	.92	.86	.73
.02	-.42	-.02	.21	.53	.65	.73	.77	.77	.77	.65	.49	.29
.05	-.61	-.35	-.16	.01	.16	.24	.27	.27	.24	.13	-.01	-.16
.10	-.61	-.42	-.29	-.12	-.03	0.00	.03	0.00	-.03	-.09	-.22	-.35
.15	-.50	-.36	-.27	-.14	-.07	0.00	0.00	-.04	-.07	-.17	-.23	-.33
.20	-.45	-.36	-.26	-.17	-.10	-.07	-.07	-.07	-.10	-.20	-.26	-.33
.25	-.46	-.37	-.32	-.21	-.18	-.15	-.15	-.15	-.18	-.24	-.35	-.37
.35	-.37	-.31	-.25	-.19	-.19	-.16	-.19	-.19	-.25	-.25	-.31	-.34
.45	-.31	-.27	-.27	-.24	-.21	-.21	-.21	-.24	-.27	-.27	-.31	-.34
.60	-.15	-.08	-.11	-.08	-.11	-.11	-.11	-.11	-.19	-.19	-.19	-.19
.75	-.11	-.09	-.11	-.09	-.09	-.11	-.14	-.14	-.17	-.17	-.17	-.17
.90	-.03	0.00	-.03	-.03	0.00	-.06	-.03	-.06	-.06	-.09	-.06	-.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 55 K = .1897 DELT AA = 6.11 MEAN AA = -.20

AA / X/C	-.19	-1.77	-3.25	-4.51	-5.49	-6.10	-6.30	-6.10	-5.49	-4.52	-3.25	-1.78
UPPER SURFACE												
.00	.95	.90	.68	.30	-.05	-.37	-.56	-.61	-.44	-.12	.20	.59
.01	.24	.58	.68	.68	.68	.63	.53	.53	.58	.68	.92	.68
.02	-.15	.16	.38	.38	.66	.81	.99	.77	.91	.70	.56	.31
.05	-.50	-.23	.01	.13	.25	.28	.37	.37	.28	.40	.10	-.13
.10	-.24	-.17	-.14	0.00	.07	.14	.17	.14	.07	0.00	-.07	-.24
.15												
.20	-.44	-.35	-.25	-.16	-.12	-.09	-.06	-.09	-.12	-.19	-.28	-.38
.25	-.41	-.33	-.27	-.24	-.21	-.12	-.12	-.15	-.07	-.27	-.33	-.41
.35	-.31	-.24	-.18	-.15	-.11	-.08	-.11	-.15	-.15	-.18	-.27	-.34
.45	-.30	-.26	-.19	-.16	-.19	-.12	-.16	-.16	-.16	-.23	-.30	-.36
.60	-.24	-.20	-.17	-.17	-.14	-.14	-.14	-.17	-.17	-.24	-.30	-.34
.75	-.15	-.11	-.11	-.11	-.11	-.11	-.15	-.22	-.18	-.18	-.22	-.22
.90	0.00	0.00	.03	.03	0.00	0.00	0.00	-.02	-.02	-.05	-.05	-.05
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.95	.90	.68	.30	-.05	-.37	-.56	-.61	-.44	-.12	.20	.59
.01	.52	.08	-.34	-.96	-1.45	-1.89	-2.07	-2.13	-1.92	-1.52	-1.02	-.50
.02	-.02	-.42	-.85	-1.29	-1.69	-2.05	-2.17	-2.17	-2.01	-1.77	-1.37	-.89
.05	-.38	-.68	-.94	-1.16	-1.39	-1.61	-1.68	-1.68	-1.61	-1.42	-1.16	-.94
.10	-.48	-.68	-.84	-1.03	-1.16	-1.20	-1.23	-1.23	-1.16	-1.10	-.97	-.81
.15	-.46	-.56	-.69	-.82	-.95	-.99	-.99	-.99	-.99	-.86	-.76	-.66
.20	-.42	-.55	-.65	-.74	-.81	-.84	-.90	-.87	-.84	-.74	-.65	-.61
.25	-.46	-.54	-.62	-.73	-.76	-.82	-.84	-.79	-.79	-.70	-.62	-.57
.35	-.43	-.46	-.55	-.61	-.64	-.67	-.67	-.64	-.64	-.61	-.49	-.46
.45	-.37	-.47	-.50	-.53	-.53	-.56	-.60	-.53	-.53	-.47	-.40	-.40
.60	-.19	-.22	-.26	-.30	-.30	-.30	-.30	-.30	-.26	-.22	-.19	-.19
.75	-.17	-.17	-.20	-.17	-.20	-.20	-.23	-.20	-.20	-.17	-.17	-.14
.90	-.03	-.03	-.03	-.06	-.06	-.09	-.06	-.09	-.09	-.03	-.06	-.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 56 K = .2232 DELT AA = 6.14 MEAN AA = -.20

AA X/C	-.20	1.38	2.86	4.14	5.11	5.73	5.93	5.73	5.11	4.14	2.87	1.39
						UPPER SURFACE						
.00	.90	.97	.95	.88	.71	.52	.44	.42	.52	.66	.83	.95
.01	.53	.24	-.14	-.77	-1.36	-1.85	-2.04	-1.99	-1.94	-1.55	-1.07	-.38
.02	.13	-.15	-.51	-.79	-1.08	-1.33	-1.44	-1.22	-1.33	-1.19	-.90	-.58
.05	-.29	-.53	-.80	-.99	-1.14	-1.29	-1.38	-1.38	-1.32	-1.23	-.99	-.71
.10	-.31	-.49	-.56	-.70	-.84	-.92	-.92	-.95	-.88	-.81	-.70	-.56
.15												
.20	-.47	-.50	-.63	-.69	-.76	-.76	-.76	-.79	-.73	-.69	-.63	-.54
.25	-.44	-.53	-.62	-.62	-.64	-.67	-.67	-.67	-.64	-.62	-.56	-.50
.35	-.34	-.40	-.40	-.47	-.50	-.50	-.50	-.47	-.47	-.44	-.37	-.34
.45	-.33	-.36	-.36	-.40	-.40	-.43	-.40	-.26	-.33	-.36	-.30	-.26
.60	-.30	-.30	-.30	-.34	-.30	-.30	-.30	-.17	-.30	-.27	-.24	-.20
.75	-.22	-.22	-.18	-.22	-.22	-.18	-.22	-.18	-.22	-.11	-.18	-.11
.90	-.02	-.02	0.00	-.02	0.00	0.00	0.00	.03	.03	0.00	0.00	.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	.90	.97	.95	.88	.71	.52	.44	.42	.52	.66	.83	.95
.01	.14	.55	.79	.92	.95	.95	.95	.95	.95	.95	.86	.73
.02	-.34	.01	.33	.57	.73	.81	.81	.77	.73	.69	.49	.33
.05	-.57	-.27	-.05	.09	.20	.31	.31	.27	.27	.16	-.01	-.16
.10	-.55	-.35	-.29	-.06	0.00	.03	.06	.03	0.00	-.09	-.19	-.32
.15	-.46	-.30	-.20	-.10	-.04	0.00	0.00	0.00	-.04	-.14	-.23	-.30
.20	-.39	-.29	-.20	-.10	-.07	-.07	-.01	-.07	-.10	-.14	-.26	-.36
.25	-.43	-.32	-.24	-.18	-.18	-.10	-.10	-.12	-.15	-.24	-.32	-.37
.35	-.31	-.25	-.19	-.16	-.13	-.16	-.13	-.16	-.22	-.25	-.31	-.34
.45	-.31	-.21	-.21	-.18	-.18	-.15	-.18	-.21	-.21	-.24	-.31	-.34
.60	-.11	-.08	-.04	-.04	-.04	0.00	-.08	-.11	-.11	-.15	-.19	-.19
.75	-.06	-.06	-.03	-.06	-.03	-.06	-.09	-.09	-.11	-.14	-.17	-.17
.90	0.00	.02	.02	0.00	0.00	0.00	0.00	-.06	-.03	-.03	-.06	-.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 56 K = .2232 DELT AA = 6.14 MEAN AA = -.20

UPPER SURFACE

AA / X/C	-.19	-1.78	-3.26	-4.54	-5.51	-6.13	-6.33	-6.13	-5.51	-4.54	-3.27	-1.79
.00	.95	.90	.64	.37	-.03	-.29	-.51	-.49	-.41	-.05	.23	.64
.01	.14	.09	.73	.77	.77	.68	.63	.68	.73	.77	.73	.77
.02	-.15	-.15	.45	.63	.77	.81	.81	.84	.84	.70	.63	.38
.05	-.44	-.44	.01	.19	.34	.37	.43	.40	.34	.25	.13	-.07
.10	-.38	-.38	-.07	.03	.10	.07	.21	.17	.14	.10	0.00	-.14
.15												
.20	-.44	-.41	-.25	-.16	-.09	-.06	-.03	-.06	-.09	-.19	-.22	-.35
.25	-.41	-.41	-.24	-.15	-.10	-.10	-.10	-.12	-.15	-.21	-.27	-.36
.35	-.27	-.27	-.15	-.08	-.05	-.05	-.02	-.05	-.11	-.15	-.21	-.24
.45	-.23	-.23	-.12	-.09	-.09	-.06	-.06	-.12	-.09	-.16	-.23	-.26
.60	-.17	-.14	.39	-.10	-.07	-.07	-.14	-.14	-.17	-.20	-.20	-.24
.75	-.08	-.08	-.04	-.01	-.04	-.08	-.08	-.11	-.11	-.15	-.15	-.18
.90	.03	.06	.03	.03	.06	.03	0.00	0.00	-.02	0.00	-.02	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

X/C	-.19	-1.78	-3.26	-4.54	-5.51	-6.13	-6.33	-6.13	-5.51	-4.54	-3.27	-1.79
.00	.95	.90	.64	.37	-.03	-.29	-.51	-.49	-.41	-.05	.23	.64
.01	.52	.11	-.34	-.87	-1.42	-1.76	-2.01	-2.01	-1.86	-1.42	-.90	-.37
.02	-.02	-.46	-.77	-1.25	-1.65	-1.93	-2.09	-2.09	-2.01	-1.65	-1.29	-.81
.05	-.38	-.64	-.87	-1.13	-1.39	-1.53	-1.61	-1.65	-1.53	-1.31	-1.13	-.83
.10	-.48	-.68	-.84	-1.00	-1.10	-1.16	-1.16	-1.16	-1.10	-1.03	-.94	-.71
.15	-.43	-.56	-.66	-.82	-.86	-.92	-.92	-.92	-.89	-.76	-.72	-.56
.20	-.42	-.52	-.61	-.71	-.77	-.81	-.81	-.81	-.77	-.65	-.58	-.52
.25	-.46	-.57	-.65	-.73	-.68	-.76	-.76	-.79	-.70	-.65	-.57	-.51
.35	-.40	-.49	-.52	-.61	-.64	-.64	-.64	-.61	-.55	-.49	-.43	-.37
.45	-.37	-.44	-.47	-.53	-.53	-.50	-.53	-.50	-.47	-.44	-.37	-.31
.60	-.22	-.26	-.22	-.26	-.26	-.26	-.26	-.22	-.22	-.19	-.15	-.11
.75	-.20	-.20	-.20	-.23	-.17	-.17	-.17	-.17	-.14	-.09	-.11	-.09
.90	-.06	-.09	-.06	-.06	-.03	-.06	-.03	-.03	-.03	0.00	0.00	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 57 K = .2647 DELT AA = 6.18 MEAN AA = -.20

AA / X/C	-.20	1.39	2.88	4.16	5.15	5.76	5.97	5.76	5.15	4.17	2.89	1.40
UPPER SURFACE												
.00	.90	1.02	1.00	.92	.76	.61	.54	.54	.64	.73	.90	1.00
.01	.58	.29	-.24	-.92	-1.31	-1.80	-2.04	-2.19	-1.85	-1.36	-.87	-.29
.02	.23	-.15	-.43	-.79	-1.04	-1.29	-1.40	-1.40	-1.29	-1.04	-.76	-.36
.05	-.26	-.53	-.83	-1.05	-1.23	-1.32	-1.35	-1.35	-1.32	-1.14	-.93	-.68
.10	-.28	-.42	-.60	-.74	-.81	-.88	-.92	-.88	-.84	-.81	-.63	-.42
.15												
.20	-.41	-.50	-.60	-.69	-.73	-.76	-.76	-.73	-.73	-.60	-.57	-.44
.25	-.50	-.64	-.67	-.76	-.76	-.79	-.76	-.73	-.73	-.67	-.62	-.53
.35	-.31	-.40	-.44	-.47	-.44	-.47	-.50	-.50	-.40	-.40	-.31	-.24
.45	-.30	-.36	-.36	-.43	-.40	-.40	-.36	-.36	-.36	-.26	-.23	-.19
.60	-.30	-.37	-.34	-.40	-.44	-.37	-.37	-.34	-.34	-.27	-.24	-.24
.75	-.18	-.22	-.18	-.18	-.18	-.18	-.18	-.11	-.11	-.11	-.08	.02
.90	0.00	-.02	.03	0.00	0.00	0.00	.03	.06	0.00	.06	.03	.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.90	1.02	1.00	.92	.76	.61	.54	.54	.64	.73	.90	1.00
.01	.17	.58	.86	.95	1.01	1.04	1.01	1.01	1.04	1.01	.98	.82
.02	-.26	.05	.41	.61	.81	.81	.89	.85	.81	.73	.61	.33
.05	-.46	-.24	-.01	.13	.27	.35	.35	.35	.31	.20	.09	-.12
.10	-.48	-.29	-.16	-.03	.03	.06	.13	.09	.03	-.03	-.16	-.29
.15	-.40	-.23	-.14	0.00	.02	.05	.05	.02	0.00	-.07	-.17	-.27
.20	-.33	-.26	-.14	-.07	-.07	-.01	.01	-.01	-.07	-.14	-.20	-.29
.25	-.37	-.24	-.15	-.10	-.10	-.07	-.07	-.07	-.12	-.18	-.26	-.32
.35	-.25	-.22	-.16	-.10	-.07	-.07	-.10	-.10	-.16	-.22	-.25	-.31
.45	-.24	-.18	-.15	-.11	-.11	-.11	-.11	-.11	-.21	-.24	-.24	-.31
.60	-.04	0.00	0.00	.02	0.00	0.00	0.00	-.04	-.08	-.08	-.11	-.15
.75	-.06	0.00	.02	.02	.02	-.03	-.03	-.06	-.11	-.09	-.11	-.11
.90	.07	.04	.02	.04	.07	.07	.04	0.00	.02	0.00	0.00	.04
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 57 K = .2647 DELT AA = 6.18 MEAN AA = -.20

UPPER SURFACE

AA X/C	-.19	-1.79	-3.28	-4.56	-5.55	-6.16	-6.37	-6.17	-5.55	-4.57	-3.29	-1.80
.00	1.02	.97	.71	.39	.01	-.22	-.37	-.37	-.17	.06	.39	.71
.01	.14	.58	.73	.82	.92	.68	.68	.73	.68	.77	.77	.73
.02	-.01	.38	.49	.70	.74	.91	.84	.88	.84	.77	.59	.49
.05	-.44	-.20	.04	.16	.28	.37	.37	.40	.31	.28	.10	-.01
.10	-.31	-.14	-.07	0.00	.14	.21	.21	.21	.14	.07	-.03	-.10
.15												
.20	-.35	-.22	-.19	-.09	-.03	0.00	-.03	-.06	-.06	-.09	-.25	-.35
.25	-.44	-.36	-.27	-.24	-.21	-.18	-.18	-.12	-.24	-.27	-.41	-.41
.35	-.18	-.11	-.08	-.02	-.08	-.08	-.02	-.08	-.05	-.15	-.15	-.24
.45	-.16	-.09	-.09	-.06	-.09	-.06	-.02	-.09	-.12	-.19	-.23	-.26
.60	-.14	-.17	-.17	-.14	-.14	-.14	-.14	-.14	-.20	-.24	-.27	-.30
.75	-.08	-.01	-.04	-.01	-.04	-.04	-.01	-.04	-.11	-.08	-.11	-.15
.90	.09	.09	.09	.09	.09	.06	.06	.03	.03	0.00	0.00	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

X/C	-.19	-1.79	-3.28	-4.56	-5.55	-6.16	-6.37	-6.17	-5.55	-4.57	-3.29	-1.80
.00	1.02	.97	.71	.39	.01	-.22	-.37	-.37	-.17	.06	.39	.71
.01	.55	.24	-.28	-.77	-1.36	-1.64	-1.83	-1.86	-1.55	-1.21	-.53	-.16
.02	-.02	-.42	-.73	-1.17	-1.57	-1.81	-1.93	-1.89	-1.73	-1.45	-1.13	-.61
.05	-.35	-.57	-.83	-1.13	-1.28	-1.42	-1.46	-1.42	-1.31	-1.13	-.94	-.64
.10	-.42	-.61	-.77	-.94	-1.03	-1.07	-1.03	-1.03	-.97	-.94	-.77	-.61
.15	-.40	-.50	-.63	-.72	-.79	-.82	-.82	-.79	-.72	-.69	-.59	-.50
.20	-.39	-.49	-.58	-.65	-.65	-.71	-.71	-.65	-.61	-.58	-.45	-.42
.25	-.43	-.51	-.59	-.62	-.65	-.65	-.65	-.62	-.57	-.54	-.46	-.37
.35	-.37	-.40	-.49	-.52	-.49	-.52	-.52	-.52	-.43	-.43	-.37	-.31
.45	-.34	-.37	-.40	-.44	-.44	-.44	-.37	-.40	-.34	-.31	-.24	-.24
.60	-.19	-.19	-.19	-.19	-.19	-.19	-.15	-.15	-.08	-.08	-.04	-.04
.75	-.11	-.11	-.11	-.11	-.11	-.11	-.09	-.06	-.03	-.03	-.03	-.03
.90	.02	.07	.04	0.00	.04	.04	.04	.02	0.00	0.00	.02	.04
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 58 K = .0321 DELT AA = 6.02 MEAN AA = 5.80

AA X/C	5.80	7.35	8.80	10.05	11.01	11.61	11.81	11.61	11.01	10.05	8.81	7.35
UPPER SURFACE												
.00	.19	-.45	-1.23	-2.02	-2.64	-3.08	-3.08	-3.02	-2.78	-1.23	-1.35	-.58
.01	-1.45	-2.37	-3.45	-4.46	-5.41	-5.94	-6.04	-5.91	-5.48	-4.79	-3.84	-2.89
.02	-1.86	-2.49	-3.20	-3.80	-4.40	-4.75	-4.79	-4.72	-4.43	-4.01	-3.45	-2.81
.05	-1.66	-2.05	-2.44	-2.77	-3.07	-3.31	-3.25	-3.22	-3.07	-2.86	-2.56	-2.20
.10	-1.40	-1.55	-1.77	-2.00	-2.15	-2.26	-2.26	-2.23	-2.15	-2.00	-1.81	-1.62
.15	-.87	-1.07	-1.31	-1.43	-1.66	-1.74	-1.70	-1.70	-1.62	-1.54	-1.31	-1.15
.20	-1.05	-1.14	-1.29	-1.42	-1.48	-1.54	-1.54	-1.54	-1.48	-1.42	-1.33	-1.23
.25	-.90	-1.07	-1.13	-1.22	-1.30	-1.33	-1.30	-1.30	-1.28	-1.22	-1.13	-1.04
.35	-.76	-.82	-.89	-.96	-1.02	-1.02	-1.02	-1.02	-.99	-.96	-.89	-.86
.45	-.64	-.71	-.78	-.78	-.85	-.89	-.82	-.82	-.82	-.75	-.71	-.68
.60	-.51	-.54	-.58	-.58	-.61	-.61	-.58	-.58	-.54	-.54	-.54	-.51
.75	-.37	-.37	-.37	-.37	-.40	-.40	-.37	-.37	-.40	-.44	-.37	-.33
.90	-.15	-.15	-.18	-.15	-.18	-.18	-.18	-.18	-.18	-.15	-.15	-.15
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.19	-.45	-1.23	-2.02	-2.64	-3.08	-3.08	-3.02	-2.78	-1.23	-1.35	-.58
.01	.83	.68	.47	.10	-.10	-.37	.25	-.34	-.19	.10	.41	.65
.02	.93	.97	1.01	1.01	.97	.93	.93	.93	.97	1.05	1.13	1.01
.05	.43	.54	.69	.80	.83	.87	.87	.83	.83	.76	.72	.65
.10	.12	.29	.42	.51	.61	.58	.61	.68	.55	.51	.45	.35
.15	.05	.49	.29	.39	.49	.46	.46	.46	.42	.39	.32	.26
.20	0.00	.12	.19	.32	.38	.38	.38	.38	.32	.29	.22	.12
.25	-.09	.15	.12	.18	.23	.23	.23	.23	.20	.18	.12	.01
.35	-.08	.03	.06	.12	.18	.15	.18	.18	.15	.12	.06	-.02
.45	-.11	-.05	.01	.07	.07	.13	.07	.10	.07	.04	.04	-.05
.60	-.05	-.01	.02	.09	.09	.13	.05	.05	.05	.05	.31	-.01
.75	-.03	0.00	.02	.05	.08	.11	.05	.05	.02	.11	.11	0.00
.90	.01	.01	.01	.04	.04	.04	-.01	-.01	.01	.01	.04	.01
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 58   K = .0321   DELT AA = 6.02   MEAN AA = 5.80

AA X/C	5.80	4.24	2.79	1.54	.58	-.01	-.21	-.01	.58	1.54	2.78	4.23
UPPER SURFACE												
.00	.01	.54	.82	.91	.93	.91	.91	.89	.91	.93	.82	.59
.01	-2.00	-1.09	-.46	.02	.25	.44	.57	.54	.48	.31	.02	-.56
.02	-2.18	-1.51	-1.15	-.59	-.38	-.20	.11	-.10	-.17	-.34	-.62	-1.15
.05	-1.90	-1.48	-1.14	-.90	-.66	-.54	-.45	-.45	-.51	-.69	-.84	-1.23
.10	-1.47	-1.21	-1.02	-.83	-.72	-.60	-.56	-.60	-.56	-.72	-.87	-1.06
.15	-.95	-.72	-.56	-.44	-.24	-.20	-.13	-.13	-.20	-.28	-.40	-.60
.20	-1.08	-.89	-.83	-.74	-.65	-.58	-.55	-.58	-.55	-.62	-.68	-.92
.25	-.90	-.78	-.72	-.60	-.55	-.49	-.49	-.49	-.46	-.52	-.58	-.81
.35	-.82	-.66	-.60	-.53	-.46	-.43	-.40	-.40	-.37	-.43	-.60	-.60
.45	-.64	-.57	-.50	-.47	-.47	-.40	-.36	-.40	-.40	-.43	-.47	-.50
.60	-.51	-.44	-.41	-.41	-.34	-.27	-.34	-.31	-.31	-.34	-.41	-.41
.75	-.37	-.33	-.29	-.29	-.26	-.26	-.22	-.22	-.18	-.22	-.33	-.29
.90	-.15	-.15	-.09	-.12	-.12	-.09	-.09	-.09	-.09	-.09	-.09	-.12
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.01	.54	.82	.91	.93	.91	.91	.89	.91	.93	.82	.59
.01	.89	.89	.80	.62	.47	.28	.25	.31	.47	.65	.83	.89
.02	1.01	.77	.57	.26	.10	.22	-.13	-.09	.14	.34	.53	.77
.05	.47	.28	.06	-.15	-.29	-.40	-.44	.14	-.29	-.11	.06	.25
.10	.16	.03	-.12	-.29	-.38	-.51	-.48	-.45	-.42	-.19	-.12	.03
.15	.09	-.04	-.17	-.31	-.37	-.48	-.41	-.41	-.37	-.31	-.17	-.04
.20	0.00	-.09	-.22	-.32	-.38	-.45	-.45	-.42	-.38	-.22	-.19	-.09
.25	-.06	-.14	-.25	-.33	-.39	-.44	-.47	-.42	-.39	-.33	-.22	-.11
.35	-.08	-.17	-.26	-.32	-.35	-.38	-.38	-.38	-.32	-.26	-.17	-.14
.45	-.02	-.18	-.21	-.31	-.24	-.34	-.34	-.34	-.31	-.24	-.18	-.15
.60	-.05	-.08	-.12	-.20	-.20	-.20	-.20	-.20	-.16	-.05	-.12	-.08
.75	0.00	-.03	-.06	-.09	-.09	-.09	-.09	-.12	-.06	.11	-.03	-.06
.90	.01	.01	-.01	-.03	-.03	-.03	.01	-.03	-.01	.01	.01	.01
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 59 K = .0498 DELT AA = 6.03 MEAN AA = 5.80

AA	5.80	7.36	8.81	10.06	11.02	11.62	11.82	11.62	11.02	10.06	8.81	7.36
X/C												
						UPPER SURFACE						
.00	.08	-.49	-1.30	-2.09	-2.78	-3.11	-3.22	-3.08	-2.74	-2.07	-1.44	-.72
.01	-1.45	-2.59	-3.45	-4.56	-5.28	-5.77	-5.91	-5.77	-5.38	-4.59	-3.77	-2.92
.02	-1.82	-2.60	-3.20	-3.69	-4.22	-4.57	-4.65	-4.57	-4.22	-3.80	-3.31	-2.67
.05	-1.54	-2.02	-2.35	-2.71	-2.92	-3.10	-3.22	-3.16	-3.04	-2.71	-2.47	-2.11
.10	-1.24	-1.51	-1.74	-1.89	-1.96	-2.11	-2.11	-2.11	-2.04	-1.89	-1.70	-1.47
.15	-.76	-.99	-1.27	-1.35	-1.47	-1.54	-1.58	-1.54	-1.47	-1.35	-1.19	-.99
.20	-.89	-1.05	-1.20	-1.29	-1.36	-1.42	-1.42	-1.42	-1.39	-1.33	-1.20	-1.11
.25	-.78	-.90	-1.01	-1.13	-1.16	-1.22	-1.25	-1.22	-1.19	-1.13	-1.04	-.95
.35	-.60	-.69	-.76	-.86	-.92	-.89	-.96	-.99	-.92	-.86	-.76	-.69
.45	-.54	-.61	-.64	-.71	-.71	-.71	-.71	-.71	-.71	-.64	-.61	-.64
.60	-.37	-.41	-.44	-.51	-.44	-.48	-.51	-.44	-.54	-.41	-.44	-.34
.75	-.22	-.22	-.22	-.29	-.22	-.26	-.26	-.22	-.29	-.18	-.26	-.18
.90	-.09	-.09	-.09	-.09	-.09	-.12	-.09	-.09	-.09	-.06	-.06	-.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	.08	-.49	-1.30	-2.09	-2.78	-3.11	-3.22	-3.08	-2.74	-2.07	-1.44	-.72
.01	.80	.68	.44	.10	-.22	-.40	-.43	-.31	-.13	.10	.34	1.19
.02	.93	1.01	.97	.97	.97	.93	.85	1.09	.89	1.01	1.52	1.01
.05	.43	.58	.65	.76	.80	.87	.94	1.24	.80	.83	.69	.61
.10	.12	.32	.38	.45	.55	.51	.61	.58	.55	.51	.45	.29
.15	.05	.32	.29	.32	.42	.49	.42	.46	.59	.36	.29	.19
.20	0.00	.12	.25	.29	.32	.45	.42	.38	.38	.32	.22	.12
.25	-.03	.04	.07	.18	.23	.29	.29	.26	.20	.15	.09	.01
.35	-.05	.09	.09	.12	.18	.18	.21	.15	.15	.24	.03	0.00
.45	-.08	-.02	-.02	.04	.10	.13	.13	.10	.04	.07	.07	-.05
.60	-.01	.02	.02	.05	.09	.13	.09	.09	.05	.02	.20	-.05
.75	0.00	.05	.08	.05	.02	.11	.08	.08	.05	.02	.02	0.00
.90	.01	.01	.01	.01	.01	.01	.01	.04	.01	.01	-.01	-.01
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 59 K = .0498 DELT AA = 6.03 MEAN AA = 5.80

UPPER SURFACE

AA X/C	5.80	4.24	2.78	1.53	.57	-.02	-.22	-.02	.57	1.53	2.78	4.23
.00	-.05	.45	.77	.91	.89	.79	.89	.91	.86	.93	.84	.68
.01	-1.84	-1.05	-.37	.08	.41	.54	.61	.57	.54	.28	-.01	-.53
.02	-2.07	-1.54	-.98	-.55	-.24	-.10	-.06	-.06	-.13	-.34	-.62	-1.08
.05	-1.60	-1.42	-1.08	-.81	-.57	-.45	-.45	-.45	-.48	-.66	-.90	-1.23
.10	-1.32	-1.17	-.87	-.72	-.56	-.60	-.53	-.53	-.56	-.72	-.79	-1.02
.15	-.83	-.64	-.40	-.28	-.13	-.09	-.09	-.09	-.13	-.28	-.32	-.48
.20	-.99	-.83	-.74	-.65	-.55	-.55	-.49	-.46	-.55	-.58	-.68	-.77
.25	-.84	-.72	-.60	-.55	-.49	-.43	-.40	-.43	-.46	-.52	-.55	-.66
.35	-.66	-.56	-.50	-.43	-.37	-.37	-.30	-.37	-.37	-.43	-.46	-.56
.45	-.54	-.47	-.43	-.40	-.36	-.36	-.29	-.26	-.36	-.33	-.40	-.47
.60	-.34	-.31	-.27	-.24	-.21	-.21	-.24	-.24	-.21	-.27	-.31	-.34
.75	-.18	-.18	.03	-.11	-.15	-.15	-.15	-.11	-.15	-.15	-.18	-.18
.90	-.03	-.06	0.00	-.03	0.00	-.03	0.00	-.03	-.03	-.09	-.03	-.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

AA X/C	5.80	4.24	2.78	1.53	.57	-.02	-.22	-.02	.57	1.53	2.78	4.23
.00	-.05	.45	.77	.91	.89	.79	.89	.91	.86	.93	.84	.68
.01	.83	.86	.83	.71	.50	.44	.22	.28	.44	.62	.80	.89
.02	1.01	.81	.73	.38	.10	-.05	-.05	-.09	.02	.26	.46	.73
.05	.47	.32	.06	-.07	-.22	-.26	-.44	-.40	-.29	-.11	.06	.25
.10	.16	.03	-.16	-.25	-.29	.03	-.51	-.48	-.42	-.29	-.16	0.00
.15	.15	-.04	-.07	-.27	-.24	-.41	-.41	-.44	-.41	-.31	-.17	-.04
.20	.09	-.06	-.19	-.29	-.38	-.45	-.25	-.38	-.42	-.29	-.25	-.09
.25	-.06	-.17	-.25	-.33	-.36	-.39	-.44	-.42	-.39	-.31	-.25	-.14
.35	-.08	-.14	-.11	-.29	-.35	-.38	-.05	-.38	-.32	-.26	-.20	-.08
.45	-.11	-.18	-.21	-.27	-.34	-.34	-.34	-.34	-.31	-.27	-.21	-.21
.60	-.08	-.08	.24	-.12	-.20	-.23	-.20	-.20	-.12	-.12	-.12	-.05
.75	-.06	-.06	-.09	-.09	-.09	-.12	-.12	-.09	-.09	-.06	-.03	0.00
.90	-.03	-.03	-.01	-.01	-.03	-.01	-.03	-.03	-.03	-.01	.01	.01
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 60 K = .0770 DELT AA = 6.04 MEAN AA = 5.80

AA X/C	5.80	7.36	8.81	10.07	11.03	11.63	11.83	11.63	11.03	10.07	8.82	7.36
						UPPER SURFACE						
.00	.19	-.42	-1.09	-1.90	-2.55	-3.02	-3.08	-3.15	-2.71	-2.23	-1.58	-.84
.01	-1.09	-2.00	-3.12	-4.14	-5.09	-5.68	-5.81	-5.81	-5.45	-4.79	-4.00	-3.15
.02	-1.58	-2.25	-2.92	-3.55	-4.15	-4.50	-4.65	-4.61	-4.36	-3.90	-3.45	-2.88
.05	-1.45	-1.90	-2.26	-2.62	-2.95	-3.10	-3.16	-3.16	-3.01	-2.77	-2.56	-2.26
.10	-1.17	-1.40	-1.62	-1.85	-2.11	-2.11	-2.11	-2.11	-2.04	-1.92	-1.77	-1.66
.15	-.72	-.95	-1.15	-1.39	-1.50	-1.58	-1.58	-1.58	-1.50	-1.39	-1.27	-1.15
.20	-.86	-1.05	-1.17	-1.33	-1.45	-1.42	-1.42	-1.42	-1.36	-1.29	-1.26	-1.17
.25	-.81	-.90	-1.01	-1.13	-1.25	-1.25	-1.22	-1.22	-1.16	-1.13	-1.07	-1.04
.35	-.63	-.73	-.82	-.89	-.96	-.96	-.92	-.96	-.92	-.86	-.82	-.79
.45	-.54	-.64	-.68	-.71	-.78	-.75	-.71	-.71	-.68	-.64	-.64	-.64
.60	-.41	-.48	-.48	-.51	-.61	-.51	-.48	-.48	-.44	-.44	-.44	-.48
.75	-.26	-.29	-.29	-.33	-.37	-.33	-.29	-.22	-.29	-.22	-.26	-.33
.90	-.09	-.15	-.09	-.09	-.15	-.12	-.09	-.09	-.09	-.09	-.09	-.09
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	.19	-.42	-1.09	-1.90	-2.55	-3.02	-3.08	-3.15	-2.71	-2.23	-1.58	-.84
.01	.83	.71	.50	.10	-.10	-.31	-.34	-.31	-.22	.04	.31	.59
.02	.93	1.01	1.01	1.01	1.01	.93	.97	.97	1.01	1.01	1.01	1.01
.05	.39	.58	.69	.80	.83	.87	.91	.87	.83	.80	.76	.69
.10	.12	.25	.38	.51	.55	.55	.58	.61	.55	.51	.42	.32
.15	.05	.19	.29	.36	.42	.46	.46	.46	.46	.36	.32	.19
.20	.03	.09	.22	.32	.35	.42	.38	.38	.38	.35	.22	.16
.25	-.03	.04	.12	.18	.23	.29	.31	.29	.23	.18	.12	.01
.35	-.08	.03	.09	.12	.18	.24	.21	.21	.18	.12	.06	-.02
.45	-.05	-.05	-.02	.07	.10	.17	.13	.13	.10	.04	.04	-.08
.60	-.05	.02	.05	.09	.13	.15	.13	.13	.13	.05	.05	-.01
.75	0.00	.02	.19	.05	.08	.11	.11	.05	.05	.06	.25	0.00
.90	.01	.01	.04	.04	.04	.04	.04	.04	.01	.04	.04	-.01
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 60 K = .0770 DELT AA = 6.04 MEAN AA = 5.80

UPPER SURFACE

AA / X/C	5.80	4.23	2.78	1.53	.57	-.03	-.23	-.03	.56	1.52	2.77	4.23
.00	-.14	.33	.75	.91	.89	.89	.84	.89	.89	.93	.70	.31
.01	-2.17	-1.35	-.63	-.01	.38	.48	.57	.57	.54	.41	-.43	-1.05
.02	-2.28	-1.68	-1.22	-.73	[illegible]	-.24	-.13	-.10	-.20	-.34	-1.19	-1.51
.05	-1.90	-1.54	-1.23	-.93	[illegible]	-.57	-.48	-.51	-.54	-.66	-1.17	-1.45
.10	-1.43	-1.28	-1.02	-.79	-.64	-.53	-.26	-.56	-.60	-.60	-1.02	-1.17
.15	-.95	-.72	-.60	-.36	-.20	-.17	-.17	-.17	-.20	-.24	-.56	-.83
.20	-1.05	-.92	-.86	-.71	-.58	-.58	-.55	-.55	-.55	-.62	-.80	-.89
.25	-.93	-.81	-.69	-.58	-.49	-.52	-.46	-.49	-.52	-.55	-.72	-.75
.35	-.73	-.69	-.60	-.43	-.43	-.40	-.40	-.40	-.43	-.40	-.56	-.63
.45	-.61	-.54	-.50	-.43	-.36	-.40	-.40	-.43	-.43	-.43	-.47	-.54
.60	-.44	-.41	-.34	-.34	-.31	-.27	-.27	-.31	-.27	-.27	-.34	-.41
.75	-.29	-.26	-.22	-.22	-.18	-.22	-.18	-.22	-.22	-.22	-.26	-.26
.90	-.15	-.09	-.06	-.06	-.03	-.09	-.06	-.09	-.09	-.09	-.06	-.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

AA / X/C	5.80	4.23	2.78	1.53	.57	-.03	-.23	-.03	.56	1.52	2.77	4.23
.00	-.14	.33	.75	.91	.89	.89	.84	.89	.89	.93	.70	.31
.01	.80	.86	.86	.71	.52	.31	.25	.25	.38	.56	.86	.86
.02	.93	.81	.61	.38	.18	-.05	-.13	-.13	-.01	.22	.69	1.13
.05	.47	.32	.14	.03	-.22	-.37	-.40	-.40	-.33	-.22	.17	.39
.10	.19	0.00	-.12	-.25	-.35	-.48	-.55	-.48	-.42	-.29	-.03	.12
.15	.12	-.04	-.14	-.24	-.34	-.44	-.51	-.44	-.41	-.27	-.10	.15
.20	.03	-.09	-.19	-.29	-.38	-.45	-.51	-.42	-.42	-.29	-.12	0.00
.25	-.03	-.14	-.22	-.31	-.39	-.44	-.47	-.44	-.42	-.31	-.17	-.03
.35	-.05	-.17	-.20	-.26	-.32	-.35	-.38	-.38	-.32	-.29	-.14	-.05
.45	-.11	-.15	-.21	-.27	-.31	-.34	-.34	-.37	-.24	-.24	-.02	-.05
.60	-.05	-.08	-.12	-.12	-.20	-.20	-.20	-.20	-.16	-.08	-.05	.02
.75	0.00	-.03	-.06	-.06	-.09	-.09	-.09	-.09	-.12	-.06	0.00	.05
.90	.01	-.01	-.01	-.01	-.01	-.01	-.01	.01	-.01	.01	.04	.04
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 61 K = .1011 DELT AA = 6.06 MEAN AA = 5.80

AA / X/C	5.80	7.36	8.82	10.08	11.04	11.65	11.85	11.65	11.04	10.06	8.83	7.36
UPPER SURFACE												
.00	.25	-.26	-.96	-1.67	-2.37	-2.91	-3.17	-3.15	-2.23	-2.14	-1.43	-.63
.01	-1.11	-2.16	-3.09	-4.05	-4.90	-5.43	-5.80	-5.80	-5.47	-4.77	-3.91	-2.92
.02	-1.58	-2.28	-2.91	-3.40	-3.99	-4.34	-4.55	-4.58	-4.34	-3.85	-3.33	-2.70
.05	-1.46	-1.88	-2.26	-2.56	-2.86	-3.00	-3.12	-3.12	-3.00	-2.77	-2.47	-2.11
.10	-1.18	-1.36	-1.55	-1.74	-1.96	-2.00	-2.07	-2.11	-2.04	-1.89	-1.70	-1.40
.15	-.65	-.81	-1.01	-1.29	-1.37	-1.49	-1.53	-1.57	-1.45	-1.33	-1.17	-.81
.20	-.80	-.95	-1.11	-1.17	-1.23	-1.32	-1.32	-1.39	-1.29	-1.23	-1.11	-.52
.25	-.75	-.86	-.98	-1.04	-1.21	-1.21	-1.18	-1.21	-1.15	-1.07	-1.01	-.92
.35	-.61	-.71	-.74	-.81	-.90	-.87	-.94	-.94	-.87	-.81	-.77	-.64
.45	-.48	-.52	-.48	-.62	-.69	-.66	-.69	-.69	-.62	-.62	-.55	-.52
.60	-.39	-.39	-.43	-.43	-.49	-.43	-.53	-.53	-.46	-.43	-.39	-.36
.75	-.21	-.24	-.28	-.21	-.24	-.28	-.32	-.28	-.24	-.21	-.21	-.21
.90	-.05	-.05	-.05	-.05	-.14	-.08	-.11	-.11	-.08	-.02	-.02	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.25	-.26	-.96	-1.67	-2.37	-2.91	-3.17	-3.15	-2.23	-2.14	-1.43	-.63
.01	.98	.86	.61	.31	.03	-. 0	-.29	-.26	-.11	.19	.49	.74
.02	.93	.97	.97	.97	1.16	[illegible]	.93	.89	.97	.97	1.16	.97
.05	.40	.54	.65	.80	.84	[illegible]	.84	.84	.84	.80	.87	.62
.10	.20	.26	.39	.49	.49	.62	.59	.59	.55	.52	.49	.26
.15	.03	.13	.23	.30	.60	.36	.53	.50	.40	.33	.23	.26
.20	-.02	.07	.17	.26	.26	.33	.33	.30	.30	.26	.17	.04
.25	-.11	-.02	.10	.13	.13	.18	.18	.16	.16	.10	.02	-.05
.35	-.07	-.01	.04	.07	.07	.13	.10	.07	.10	.07	.01	-.04
.45	-.09	-.06	.03	.09	.09	.06	.06	.03	.09	0.00	0.00	-.06
.60	-.01	-.01	.06	.06	.06	.09	.09	.06	.06	.02	-.01	-.01
.75	-.06	-.06	-.06	-.03	0.00	0.00	0.00	0.00	-.03	-.03	-.03	-.03
.90	-.02	-.02	.02	0.00	-.02	-.02	-.02	-.02	-.05	-.02	-.02	-.05
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 61 K = .1011 DELT AA = 6.06 MEAN AA = 5.80

UPPER SURFACE

AA X/C	5.80	4.23	2.77	1.51	.55	-.05	-.25	-.05	.55	1.51	2.76	4.22
.00	.01	.51	.79	.93	.93	.95	.98	.98	.93	.95	.86	.67
.01	-2.03	-1.20	-.51	.04	.37	.57	.64	.67	.57	.37	.04	-.44
.02	-2.18	-1.58	-1.06	-.67	-.36	-.19	-.08	-.08	-.15	-.33	-.64	-1.09
.05	-1.79	-1.46	-1.14	-.84	-.69	-.51	-.48	-.48	-.54	-.69	-.90	-1.17
.10	-1.33	-1.14	-.92	-.84	-.65	-.58	-.51	-.47	-.54	-.65	-.80	-.95
.15	-.81	-.57	-.41	-.29	-.18	-.06	-.02	-.06	-.06	-.18	-.26	-.45
.20	-.86	-.86	-.68	-.62	-.52	-.46	-.43	-.43	-.43	-.52	-.58	-.71
.25	-.81	-.72	-.61	-.55	-.49	-.43	-.32	-.40	-.43	-.49	-.55	-.61
.35	-.64	-.58	-.48	-.42	-.38	-.35	-.25	-.38	-.38	-.42	-.48	-.51
.45	-.48	-.45	-.38	-.38	-.35	-.31	-.31	-.28	-.31	-.35	-.39	-.45
.60	-.39	-.36	-.29	-.29	-.29	-.16	-.09	-.23	-.23	-.26	-.26	-.29
.75	-.21	-.21	-.17	-.17	-.17	-.17	-.17	-.17	-.17	-.21	-.17	-.17
.90	-.02	-.02	-.02	-.05	-.05	-.02	0.00	-.02	-.02	-.08	-.02	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

AA X/C	5.80	4.23	2.77	1.51	.55	-.05	-.25	-.05	.55	1.51	2.76	4.22
.00	.01	.51	.79	.93	.93	.95	.98	.98	.93	.95	.86	.67
.01	.95	.95	.92	.74	.58	.43	.37	.46	.55	.74	.92	.98
.02	.93	.73	.61	.34	.10	-.04	-.12	-.12	.06	.26	.54	.73
.05	.62	.29	.07	-.11	-.33	-.36	-.40	-.36	-.25	-.14	.03	.25
.10	.39	.01	-.15	-.31	-.37	-.47	-.47	-.43	-.34	-.24	-.05	.04
.15	.03	-.13	-.19	-.33	-.46	-.49	-.49	-.46	-.39	-.29	-.19	-.09
.20	.01	-.15	-.27	-.40	-.43	-.47	-.50	-.47	-.40	-.31	-.21	-.11
.25	-.13	-.19	-.32	-.41	-.46	-.49	-.49	-.46	-.41	-.32	-.27	-.16
.35	-.16	-.25	-.31	-.40	-.43	-.46	-.40	-.40	-.34	-.31	-.22	-.13
.45	-.15	-.22	-.22	-.31	-.34	-.34	-.38	-.28	-.28	-.25	-.19	-.09
.60	-.01	-.12	-.12	-.23	-.23	-.19	-.19	-.16	-.12	-.12	-.08	-.05
.75	-.12	-.09	.19	-.18	-.18	-.15	-.18	-.15	-.12	-.12	-.09	-.06
.90	-.05	-.05	-.05	-.08	-.08	-.08	-.08	-.05	-.02	-.02	-.02	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 62 K = .1300 DELT AA = 6.07 MEAN AA = 5.80

UPPER SURFACE

AA / X/C	5.80	7.37	8.83	10.09	11.05	11.66	11.86	11.66	11.05	10.09	8.83	7.37
.00	.32	-.16	-1.17	-1.57	-2.37	-2.79	-3.08	-2.98	-2.18	-1.76	-1.29	-.59
.01	-1.01	-1.93	-2.96	-3.81	-4.67	-5.24	-5.63	-5.27	-5.27	-4.48	-3.58	-2.69
.02	-1.51	-2.11	-2.80	-3.29	-3.43	-4.23	-4.44	-4.37	-4.16	-3.71	-3.12	-2.56
.05	-1.43	-1.82	-2.20	-2.50	-2.74	-3.06	-3.06	-3.06	-2.88	-2.47	-2.32	-2.03
.10	-1.14	-1.33	-1.51	-1.74	-1.92	-2.00	-2.07	-2.11	-1.96	-1.77	-1.55	-1.40
.15	-.41	-.61	-.85	-.97	-1.17	-1.21	-1.37	-1.25	-1.17	-.97	-.81	-.69
.20	-.83	-.92	-1.11	-1.17	-1.29	-1.26	-1.36	-1.36	-1.05	-1.20	-1.08	-.95
.25	-.75	-.86	-1.01	-1.04	-1.12	-1.12	-1.15	-1.18	-1.12	-1.04	-.92	-.86
.35	-.61	-.71	-.77	-.84	-.81	-.87	-.90	-.84	-.84	-.84	-.68	-.64
.45	-.52	-.52	-.59	-.62	-.62	-.66	-.66	-.62	-.62	-.52	-.52	-.45
.60	-.36	-.39	-.43	-.46	-.43	-.43	-.43	-.43	-.43	-.39	-.33	-.33
.75	-.24	-.28	-.28	-.24	-.28	-.28	-.32	-.24	-.24	-.21	-.17	-.17
.90	-.05	-.05	-.08	-.05	-.08	-.02	-.08	-.02	-.05	0.00	-.02	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

AA / X/C	5.80	7.37	8.83	10.09	11.05	11.66	11.86	11.66	11.05	10.09	8.83	7.37
.00	.32	-.16	-1.17	-1.57	-2.37	-2.79	-3.08	-2.98	-2.18	-1.76	-1.29	-.59
.01	.98	.89	.67	.37	.40	-.17	.40	-.17	-.02	.22	.55	.77
.02	.89	.97	.97	1.01	1.16	.97	1.16	.97	.97	1.05	1.05	.97
.05	.40	.54	.65	.80	.84	.84	.84	.87	.84	.76	.73	.62
.10	.33	.30	.42	.46	.59	.59	.62	.59	.59	.52	.55	.33
.15	.06	.13	.26	.33	.43	.43	.43	.40	.40	.33	.26	.13
.20	.01	.07	.20	.42	.30	.36	.33	.33	.26	.23	.17	.07
.25	-.05	.02	.10	.13	.21	.18	.18	.16	.13	.13	.05	-.02
.35	.01	-.07	.07	.10	.16	.16	.10	.10	.10	.04	-.01	-.07
.45	-.09	0.00	.03	.06	.06	.06	.09	.06	.06	.03	-.03	-.09
.60	.02	.02	.09	.13	.09	.09	.09	.02	.06	.02	.02	-.01
.75	.02	.02	.02	.04	.04	.04	.02	.02	0.00	-.03	-.03	-.06
.90	.02	0.00	0.00	0.00	.02	.02	-.02	0.00	0.00	-.02	-.02	-.05
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 62   K = .1300   DELT AA = 6.07   MEAN AA = 5.80

AA / X/C	5.80	4.23	2.76	1.50	.54	-.06	-.26	-.06	.54	1.50	2.76	4.22
						UPPER SURFACE						
.00	0.00	.55	.81	.91	.98	.95	.93	.98	1.00	.95	.86	.67
.01	-1.77	-1.11	-.41	.07	.44	.57	.64	.60	.47	.37	.04	-.48
.02	-1.79	-1.51	-1.02	-.64	-.01	-.08	-.08	-.12	-.22	-.40	-.74	-1.16
.05	-1.61	-1.37	-1.08	-.37	-.63	-.60	-.51	-.51	-.63	-.72	-.81	-1.17
.10	-1.21	-.69	-.84	-.39	-.54	-.54	-.36	-.54	-.47	-.73	-.80	-.95
.15	-.41	-.29	-.10	-.02	.09	.21	.29	.49	.17	.01	-.10	-.26
.20	-.89	-.74	-.68	-.58	-.49	-.43	-.43	-.37	-.49	-.55	-.62	-.74
.25	-.78	-.66	-.58	-.49	-.43	-.43	-.38	-.40	-.43	-.49	-.58	-.63
.35	-.61	-.51	-.32	-.38	-.35	-.38	-.35	-.32	-.38	-.45	-.42	-.55
.45	-.45	-.35	-.35	-.28	-.28	-.28	-.31	-.31	-.35	-.31	-.38	-.42
.60	-.16	-.26	-.26	-.09	-.26	-.23	-.23	-.23	-.29	-.29	0.00	-.33
.75	-.21	-.17	.08	-.09	.23	-.17	-.28	.38	-.17	-.21	-.28	-.21
.90	0.00	0.00	0.00	0.00	0.00	-.02	-.02	-.02	-.05	-.05	-.05	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	0.00	.55	.81	.91	.98	.95	.93	.98	1.00	.95	.86	.67
.01	1.04	.95	.95	.83	.67	.46	.43	.46	.58	.67	.92	.04
.02	.93	.81	.61	.34	.18	.18	-.08	-.08	.14	.26	.50	.73
.05	.51	.29	.10	-.11	-.29	-.40	-.40	-.36	-.29	-.18	.07	.25
.10	.13	.04	-.08	-.24	-.31	-.47	-.43	-.50	-.34	-.24	-.11	.01
.15	.03	-.06	-.16	-.29	-.36	-.46	-.46	-.43	-.39	-.16	-.23	-.09
.20	-.02	-.11	-.24	-.34	-.40	-.40	-.47	-.47	-.40	-.31	-.21	-.11
.25	-.13	-.19	-.32	-.38	-.43	-.49	-.49	-.41	-.41	-.32	-.24	-.16
.35	-.10	-.22	-.31	-.28	-.37	-.40	-.43	-.40	-.34	-.31	-.19	-.16
.45	-.12	-.22	-.25	-.28	-.31	-.34	-.38	-.34	-.28	-.19	-.15	-.12
.60	-.08	-.12	-.12	-.16	-.16	-.27	-.19	-.16	-.12	-.12	-.05	-.05
.75	-.09	-.12	-.12	-.12	-.12	-.20	-.18	-.12	-.12	-.09	-.03	-.03
.90	-.05	-.05	-.08	-.05	-.05	-.11	-.05	-.08	-.02	0.00	.02	.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 63 K = .1589 DELT AA = 6.08 MEAN AA = 5.80

UPPER SURFACE

AA X/C	5.80	7.37	8.83	10.09	11.06	11.67	11.87	11.67	11.06	10.09	8.84	7.37
.00	.23	-.45	-.99	-1.62	-2.32	-2.82	-2.93	-2.86	-2.46	-1.88	-1.27	-.59
.01	-1.11	-1.87	-2.79	-3.25	-4.64	-5.30	-5.60	-5.66	-5.27	-4.54	-3.68	-3.09
.02	-1.58	-2.11	-2.70	-3.26	-3.95	-3.81	-4.41	-4.48	-4.27	-3.85	-3.33	-2.84
.05	-1.46	-1.85	-2.20	-2.56	-2.83	-2.97	-3.06	-3.06	-2.94	-2.68	-2.50	-2.17
.10	-1.18	-.65	-1.55	-1.77	-2.07	-2.04	-2.07	-2.07	-2.07	-1.89	-1.70	-1.51
.15	-.22	-.37	-.73	-1.29	-1.45	-1.53	-1.53	-1.53	-1.45	-1.37	-1.21	-1.09
.20	-.86	-.99	-1.17	-1.20	-1.20	-1.32	-1.42	-1.17	-1.20	-1.26	-1.17	-1.05
.25	-.81	-.92	-1.01	-1.07	-1.18	-1.21	-1.18	-1.18	-1.09	-1.15	-1.04	-.92
.35	-.68	-.77	-.81	-.87	-.90	-.94	-.94	-.90	-.81	-.87	-.77	-.74
.45	-.55	-.62	-.62	-.69	-.69	-.69	-.69	-.69	-.38	-.62	-.38	-.59
.60	-.46	-.56	-.49	-.43	-.53	-.53	-.49	-.43	-.43	-.43	-.36	-.43
.75	-.36	-.28	-.43	-.39	-.39	-.36	-.39	-.39	-.39	-.28	-.28	-.28
.90	-.20	-.11	-.11	-.11	-.11	-.11	-.08	-.08	-.08	-.11	-.08	-.11
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

X/C	5.80	7.37	8.83	10.09	11.06	11.67	11.87	11.67	11.06	10.09	8.84	7.37
.00	.23	-.45	-.99	-1.62	-2.32	-2.82	-2.93	-2.86	-2.46	-1.88	-1.27	-.59
.01	.95	1.26	.67	.28	.12	-.08	.40	-.11	.09	.34	.52	.83
.02	1.05	1.01	1.05	1.16	1.05	1.05	.97	1.01	1.05	1.05	1.09	1.05
.05	.87	.65	.73	.84	.91	.94	.94	.91	.87	.87	.73	.69
.10	.20	.42	.49	.55	.65	.71	.71	.62	.62	.71	.42	.36
.15	.10	.23	.30	.40	.46	.50	.46	.46	.60	.33	.26	.16
.20	.07	.13	.26	.33	.36	.42	.42	.39	.36	.23	.20	.13
.25	-.02	.02	.02	.21	.24	.21	.24	.24	.18	.10	.13	.02
.35	-.07	.04	.07	.16	.16	.16	.19	.31	.13	.16	-.01	-.04
.45	0.00	.06	.06	.09	.12	.12	.09	.09	.09	.03	0.00	-.06
.60	.06	.09	.09	.09	.13	.13	.09	.13	.13	.09	.06	.02
.75	0.00	.04	.04	.07	.13	.07	.22	.02	.04	.07	.22	-.03
.90	.02	.05	.02	.02	.05	.05	.05	.05	.05	.02	.02	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 63   K = .1589   DELT AA = 6.08   MEAN AA = 5.80

AA	5.80	4.22	2.76	1.50	.53	-.07	-.27	-.07	.53	1.49	2.75	4.22
X/C												
						UPPER SURFACE						
.00	.08	.55	.84	.98	1.05	1.02	1.02	1.02	1.02	1.07	.98	.84
.01	-2.23	-1.34	-.58	-.05	.24	.44	.47	.54	.47	.17	-.08	-.61
.02	-2.28	-1.62	-1.06	-.85	-.47	-.26	-.19	-.22	.08	-.36	-.60	-1.27
.05	-1.46	-1.55	-1.20	-.87	-.72	-.60	-.57	-.51	-.66	-.72	-.99	-1.28
.10	-1.33	-1.14	-.95	-.36	-.65	-.62	-.62	-.47	-.62	-.69	-.99	-1.03
.15	-.85	-.61	-.41	-.22	-.10	.05	.13	.37	.17	.09	-.06	-.26
.20	-.95	-.80	-.71	-.65	-.55	-.55	-.49	-.43	-.52	-.62	-.68	-.80
.25	-.78	-.72	-.63	-.58	-.52	-.55	-.43	-.49	-.46	-.58	-.63	-.72
.35	-.64	-.58	-.48	-.48	-.45	-.42	-.38	-.42	-.42	-.45	-.55	-.61
.45	-.52	-.38	-.42	-.31	-.35	-.38	-.35	-.38	-.38	-.42	-.52	-.52
.60	-.46	-.33	-.33	-.26	-.36	-.29	-.16	-.29	-.29	-.29	-.39	-.46
.75	-.28	.38	-.24	-.24	-.21	-.21	-.21	-.28	-.21	-.24	-.32	-.32
.90	-.08	-.05	-.05	-.02	-.05	-.08	-.08	-.05	-.08	-.08	-.11	-.11
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	.08	.55	.84	.98	1.05	1.02	1.02	1.02	1.02	1.07	.98	.84
.01	1.01	1.01	.98	.86	.71	.58	.55	.52	.64	.80	1.16	1.10
.02	1.05	.85	.73	.50	.22	.10	.02	.06	.22	.38	.18	.73
.05	.51	.40	.14	0.00	-.22	-.22	-.29	-.22	-.18	-.07	.03	.25
.10	.23	.10	-.02	-.21	-.31	-.37	-.34	-.31	-.24	-.24	-.08	.01
.15	.16	0.00	-.06	-.23	-.33	-.36	-.36	-.36	-.26	-.19	-.06	-.06
.20	.01	-.08	-.18	-.24	-.34	-.37	-.37	-.37	-.27	-.21	-.18	-.08
.25	-.11	-.16	-.19	-.32	-.32	-.41	-.41	-.35	-.30	-.30	-.22	-.16
.35	-.13	-.16	-.25	-.25	-.28	-.34	-.31	-.31	-.25	-.16	-.16	-.10
.45	-.09	-.15	-.19	-.22	-.25	-.28	-.22	-.22	-.19	-.15	-.12	-.03
.60	-.05	-.08	-.05	-.01	-.08	-.08	-.08	-.08	.02	-.01	.02	.09
.75	-.03	-.06	-.03	0.00	-.09	-.09	-.03	-.03	-.03	0.00	.02	.02
.90	.02	0.00	.02	0.00	-.02	.02	0.00	.02	.05	.07	.02	.07
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 64 K = .1910 DELT AA = 6.11 MEAN AA = 5.80

AA	5.80	7.38	8.85	10.12	11.09	11.70	11.90	11.70	11.09	10.12	8.85	7.38
X/C												
						UPPER SURFACE						
.00	.33	-.15	-.76	-1.27	-2.11	-2.32	-2.85	-2.88	-2.32	-1.95	-1.36	-.66
.01	-1.09	-1.98	-2.90	-3.56	-4.45	-5.14	-5.30	-5.34	-5.27	-4.71	-4.02	-3.23
.02	-1.45	-2.12	-2.54	-3.17	-3.66	-4.05	-4.19	-4.36	-4.12	-3.80	-3.10	-2.75
.05	-1.49	-1.79	-2.09	-2.45	-2.69	-2.84	-2.90	-2.93	-2.63	-2.69	-2.48	-2.15
.10	-1.19	-1.37	-1.60	-1.45	-1.86	-2.01	-2.01	-2.05	-1.94	-1.90	-1.71	-1.56
.15												
.20	-.81	-.91	-1.04	-1.13	-1.16	-1.20	-1.29	-1.23	-1.20	-1.13	-1.00	-.91
.25	-.77	-.89	-.98	-1.00	-1.06	-1.09	-1.18	-1.09	-1.06	-1.00	-.80	-.80
.35	-.70	-.80	-.80	-.89	-.89	-.89	-.80	-.80	-.86	-.83	-.80	-.70
.45	-.39	-.60	-.56	-.63	-.63	-.63	-.66	-.60	-.60	-.56	-.53	-.46
.60	-.43	-.39	-.43	-.43	-.43	-.43	-.39	-.39	-.39	-.36	-.29	-.32
.75	-.38	-.35	-.38	-.38	-.35	-.35	-.31	-.31	-.27	-.35	-.20	-.27
.90	-.10	-.10	-.07	-.10	-.07	-.07	-.02	-.02	-.02	-.02	0.00	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	.33	-.15	-.76	-1.27	-2.11	-2.32	-2.85	-2.88	-2.32	-1.95	-1.36	-.66
.01	.92	.95	.68	.41	.17	-.03	-.16	-.13	.02	.26	.50	.74
.02	.73	1.01	.90	.94	.94	.90	1.16	1.01	.90	.90	.94	1.01
.05	.17	.36	.47	.58	.65	.65	-.59	.65	.61	.58	.54	.43
.10	.07	.26	.29	.38	.45	.51	-.64	.51	.57	.41	.32	.35
.15	.06	.23	.26	.36	.39	.43	.46	.39	.36	.33	.26	.16
.20	.01	.14	.17	.27	.33	.33	.33	.33	.30	.30	.17	.11
.25	-.03	.04	.10	.18	.26	.23	.26	.21	.18	.12	.04	0.00
.35	-.02	0.00	.09	.12	.15	.18	.12	.12	.12	.06	-.02	-.07
.45	-.07	-.04	.01	.08	.08	.11	.08	.04	.04	.04	-.04	-.04
.60	0.00	.03	.03	.06	.10	.06	.06	.06	.03	.03	0.00	-.07
.75	0.00	.05	.02	.05	.05	.08	.05	.02	.02	.02	.02	0.00
.90	.04	.04	.04	.07	.07	.04	.07	.04	.02	.02	0.00	.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 64 K = .1910 DELT AA = 6.11 MEAN AA = 5.80

AA / X/C	5.80	4.22	2.74	1.48	.50	-.10	-.30	-.10	.50	1.47	2.74	4.21
UPPER SURFACE												
.00	-.11	.35	.68	.82	.91	.89	.91	.93	.93	.91	.84	.63
.01	-2.41	-1.59	-.73	-.31	.15	.34	.44	.41	.38	.34	.05	-.44
.02	-2.29	-1.77	-1.17	-.82	-.47	.01	-.19	-.16	-.19	-.33	-.58	-.96
.05	-1.85	-1.55	-1.25	-.95	-.65	-.62	-.53	-.56	-.56	-.71	-.86	-1.10
.10	-1.34	-1.19	-1.00	-.89	-.51	-.44	-.59	-.59	-.44	-.44	-.74	-.77
.15												
.20	-.81	-.72	-.62	-.56	-.49	-.43	-.36	-.36	-.43	-.46	-.59	-.68
.25	-.77	-.69	-.60	-.54	-.48	-.45	-.42	-.42	-.48	-.51	-.57	-.69
.35	-.63	-.63	-.51	-.51	-.44	-.47	-.41	-.44	-.44	-.47	-.51	-.63
.45	-.46	-.46	-.35	-.35	-.28	-.28	-.28	-.35	-.35	-.35	-.39	-.46
.60	-.29	-.26	-.22	-.26	-.26	-.19	-.19	-.22	-.22	-.26	-.29	-.32
.75	-.24	-.35	-.20	-.24	-.24	-.24	-.24	-.24	-.27	-.27	-.27	-.35
.90	0.00	0.00	.03	-.02	0.00	-.02	-.02	-.02	-.02	-.02	-.02	-.05
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-.11	.35	.68	.82	.91	.89	.91	.93	.93	.91	.84	.63
.01	.89	.95	.95	.83	.86	.56	.56	.53	.62	.77	.86	.95
.02	.86	.74	.59	.36	.13	.02	-.01	.02	.09	.32	.44	.71
.05	.25	.14	-.04	-.22	-.37	-.44	-.48	-.48	-.37	-.22	-.11	.03
.10	.20	-.01	-.14	-.29	-.36	-.45	-.48	-.48	-.36	-.23	-.17	-.01
.15	.23	-.03	-.13	-.23	-.33	-.36	-.36	-.33	-.30	-.23	-.10	-.03
.20	.01	-.11	-.17	-.30	-.33	-.36	-.36	-.36	-.30	-.24	-.01	-.04
.25	-.06	-.19	-.14	-.30	-.33	-.38	-.38	-.33	-.30	-.25	-.17	-.11
.35	-.10	-.16	-.22	-.28	-.31	-.34	-.31	-.31	-.25	-.16	-.13	-.07
.45	-.17	-.17	-.24	-.27	-.30	-.30	-.30	-.27	-.20	-.17	-.11	-.07
.60	-.07	-.07	-.11	-.15	-.15	-.19	-.15	-.07	-.07	-.04	-.04	.03
.75	-.06	-.08	-.08	-.11	-.08	-.11	-.11	-.06	-.03	0.00	.02	0.00
.90	.02	0.00	-.03	0.00	0.00	.02	.02	.04	.04	.07	.02	.07
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 65 K = .2263 DELT AA = 6.13 MEAN AA = 5.80

AA / X/C	5.80	7.38	8.86	10.13	11.10	11.72	11.92	11.72	11.10	10.13	8.86	7.38
UPPER SURFACE												
.00	.26	-.29	-.87	-1.27	-2.08	-2.53	-2.76	-2.76	-2.22	-1.74	-1.20	-.76
.01	-1.29	-1.98	-2.97	-3.89	-4.51	-5.07	-5.37	-5.40	-5.17	-4.58	-3.86	-3.10
.02	-1.66	-2.19	-2.75	-3.31	-3.76	-4.15	-4.22	-4.19	-4.08	-2.36	-3.24	-2.75
.05	-1.52	-1.85	-2.24	-2.57	-2.72	-2.90	-2.99	-2.93	-2.81	-2.63	-2.42	-2.15
.10	-1.30	-1.49	-1.67	-1.82	-1.90	-2.01	-2.05	-2.01	-1.97	-1.90	-1.71	-1.56
.15												
.20	-.88	-1.00	-1.10	-1.23	-1.23	-1.26	-1.26	-1.23	-1.23	-1.16	-1.07	-.97
.25	-.86	-.98	-1.00	-1.12	-1.12	-1.15	-1.18	-1.12	-1.12	-1.00	-.95	-.89
.35	-.76	-.86	-.93	-.96	-.96	-.96	-.93	-.93	-.89	-.86	-.76	-.73
.45	-.66	-.63	-.66	-.70	-.70	-.70	-.66	-.63	-.63	-.60	-.53	-.53
.60	-.43	-.46	-.50	-.50	-.50	-.50	-.46	-.43	-.43	-.39	-.36	-.36
.75	-.42	-.42	-.42	-.42	-.42	-.42	-.38	-.38	-.38	-.35	-.31	-.27
.90	-.10	-.13	-.10	-.10	-.10	-.10	-.07	-.07	-.10	-.07	-.05	-.07
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.26	-.29	-.87	-1.27	-2.08	-2.53	-2.76	-2.76	-2.22	-1.74	-1.20	-.76
.01	1.26	.86	.65	.41	.20	-.06	-.03	-.03	.14	.23	.56	.58
.02	1.01	.94	1.01	.94	.90	.82	.97	.90	.90	.78	.94	.94
.05	.25	.43	.50	.58	.61	.58	.65	.65	.65	.61	.50	.39
.10	.57	.26	.41	.41	.41	.54	.51	.57	.41	.38	.32	.23
.15	.46	.19	.46	.33	.46	.43	.46	.46	.36	.46	.46	.16
.20	.46	.14	.62	.30	.33	.36	.40	.33	.30	.40	.17	.08
.25	.12	.07	.26	.18	.21	.26	.26	.23	.15	.21	.12	.12
.35	.06	.06	.21	.15	.18	.18	.15	.21	.12	.30	.09	-.05
.45	.11	.01	.04	.08	.04	.11	.08	.11	.04	.01	-.04	-.07
.60	.03	.03	.10	.03	.06	.10	.17	.10	.03	0.00	0.00	-.07
.75	.05	.08	.08	.08	.11	.05	.02	.02	0.00	0.00	-.03	-.08
.90	.07	.07	.04	.07	.07	.07	.04	.02	.02	.02	0.00	-.03
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 65 K = .2263 DELT AA = 6.13 MEAN AA = 5.80

AA / X/C	5.80	4.21	2.73	1.46	.49	-.12	-.32	-.12	.49	1.46	2.73	4.21
UPPER SURFACE												
.00	-.22	.30	.63	.82	.89	.93	.93	.91	.96	.91	.89	.65
.01	-2.21	-1.36	-.63	-.17	.05	.28	.38	.38	.31	.21	-.07	-.67
.02	-2.19	-1.66	-1.14	-.79	-.54	-.30	-.23	-.23	-.30	-.47	-.75	-1.14
.05	-1.82	-1.52	-1.19	-.95	-.80	-.65	-.59	-.59	-.65	-.77	-.98	-1.28
.10	-1.37	-1.22	-1.00	-.85	-.74	-.74	-.66	-.66	-.74	-.77	-.89	-1.07
.15												
.20	-.84	-.72	-.65	-.59	-.52	-.49	-.46	-.49	-.52	-.59	-.65	-.75
.25	-.80	-.66	-.63	-.54	-.54	-.51	-.48	-.51	-.54	-.60	-.69	-.74
.35	-.70	-.63	-.60	-.54	-.51	-.47	-.51	-.51	-.57	-.60	-.60	-.73
.45	-.46	-.46	-.39	-.39	-.35	-.35	-.42	-.39	-.42	-.46	-.56	-.53
.60	-.32	-.32	-.36	-.32	-.29	-.29	-.29	-.26	-.32	-.36	-.36	-.39
.75	-.27	-.31	-.31	-.31	-.31	-.31	-.31	-.27	-.35	-.35	-.35	-.38
.90	-.05	-.07	-.07	-.07	-.07	-.13	-.07	-.05	-.07	-.07	-.10	-.10
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-.22	.30	.63	.82	.89	.93	.93	.91	.96	.91	.89	.65
.01	.86	.98	.92	.86	.74	.62	.53	.56	.65	.74	.92	.95
.02	.90	.78	.63	.44	.21	.06	-.01	.06	.17	.28	.51	.67
.05	.36	.25	-.07	-.22	-.37	-.41	-.37	-.44	-.41	-.19	-.04	0.00
.10	.20	.07	-.14	-.29	-.36	-.42	-.42	-.39	-.26	-.26	-.11	-.01
.15	.13	0.00	-.16	-.23	-.30	-.20	-.33	-.36	-.30	-.20	-.10	0.00
.20	.01	-.04	-.11	-.24	-.33	-.33	-.36	-.30	-.27	-.20	-.14	-.07
.25	.02	-.19	-.25	-.30	-.30	-.33	-.36	-.28	-.25	-.14	-.19	-.08
.35	-.07	-.13	-.22	-.31	-.31	-.28	-.22	-.28	-.22	-.13	-.10	-.07
.45	-.01	-.14	-.24	-.24	-.24	-.24	-.20	-.20	-.20	-.17	-.11	.04
.60	-.07	-.07	-.19	-.15	-.19	-.19	-.07	-.19	-.11	-.07	0.00	-.04
.75	-.06	-.08	-.08	-.11	-.11	-.06	-.03	-.03	0.00	-.06	0.00	.05
.90	-.03	-.03	-.06	-.06	-.03	.02	.02	0.00	.02	.02	.07	.04
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 66 K = .2680 DELT AA = 6.17 MEAN AA = 5.80

AA X/C	5.80	7.39	8.88	10.16	11.14	11.75	11.96	11.75	11.14	10.16	8.88	7.39
UPPER SURFACE												
.00	.28	-.25	-.92	-1.55	-1.88	-2.53	-2.71	-2.67	-2.34	-1.85	-1.18	-.43
.01	-1.16	-2.08	-2.84	-3.63	-4.51	-5.04	-5.24	-5.24	-4.65	-4.35	-3.63	-2.87
.02	-1.87	-2.50	-2.92	-3.52	-4.01	-3.80	-4.40	-4.36	-4.15	-3.80	-5.34	-2.71
.05	-1.58	-1.94	-2.18	-2.51	-2.75	-2.90	-2.99	-2.93	-2.81	-2.63	-2.39	-2.12
.10	-1.26	-1.41	-1.52	-1.75	-1.90	-1.97	-1.97	-2.01	-1.90	-1.79	-1.64	-1.45
.15												
.20	-1.00	-1.13	-1.23	-1.32	-1.39	-1.42	-1.42	-1.39	-1.36	-1.29	-1.20	-1.10
.25	-1.00	-1.12	-1.18	-1.24	-1.30	-1.30	-1.30	-1.30	-1.24	-1.27	-1.12	-1.03
.35	-.76	-.83	-.86	-.93	-.93	-.93	-.93	-.93	-.86	-.80	-.76	-.73
.45	-.53	-.60	-.60	-.70	-.66	-.73	-.63	-.60	-.56	-.53	-.53	-.46
.60	-.36	-.43	-.43	-.46	-.39	-.46	-.39	-.36	-.32	-.32	-.32	-.29
.75	-.35	-.38	-.35	-.35	-.35	-.35	-.35	-.31	-.27	-.27	-.20	-.24
.90	-.07	-.07	-.07	-.10	-.07	-.07	-.05	-.02	-.02	-.02	-.02	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	.28	-.25	-.92	-1.55	-1.88	-2.53	-2.71	-2.67	-2.34	-1.85	-1.18	-.43
.01	.89	.83	.59	.38	.14	0.00	-.06	.02	.11	.35	.56	.77
.02	.74	.94	.94	.94	1.01	.94	.90	.94	.97	.97	.90	.94
.05	.32	.47	.50	.58	.54	.65	.65	1.09	.61	.61	.36	.36
.10	.17	.26	.57	.57	.57	.51	.51	.57	.41	.35	.20	.17
.15	.06	.26	.46	.46	.43	.39	.39	.46	.46	.29	.13	.09
.20	.08	.40	.30	.30	.30	.33	.33	.30	.24	.17	.04	.01
.25	.02	.21	.21	.21	.18	.18	.21	.18	.12	.07	0.00	-.11
.35	.03	.09	.09	.12	.21	.15	.15	.15	.09	-.02	0.00	-.10
.45	.01	.11	.08	.11	.11	.08	.11	.04	-.01	-.04	-.04	-.17
.60	-.07	-.07	0.00	0.00	0.00	0.00	-.07	-.04	0.00	-.07	-.11	-.26
.75	.02	.05	.05	.02	0.00	0.00	0.00	.02	.02	-.06	0.00	-.11
.90	.07	.07	.07	.04	.04	.02	.02	.02	0.00	-.03	-.03	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 66 K = .2680 DELT AA = 6.17 MEAN AA = 5.80

AA X/C	5.80	4.20	2.71	1.43	.45	-.15	-.36	-.16	.45	1.43	2.71	4.20
						UPPER SURFACE						
.00	-.01	.49	.72	.84	.91	.91	.93	.91	.93	.86	.34	.58
.01	-2.05	-1.42	-.67	-.14	.18	.31	.38	.38	.31	.01	-.40	-.93
.02	-2.36	-1.94	-1.38	-1.00	-.72	-.61	-.51	-.58	-.68	-.93	-1.24	-1.63
.05	-1.82	-1.52	-1.22	-.98	-.77	-.71	-.62	-.68	-.71	-.92	-1.16	-1.43
.10	-1.30	-1.19	-.96	-.81	-.70	-.66	-.62	-.70	-.74	-.85	-1.00	-1.15
.15												
.20	-1.00	-.91	-.78	-.72	-.65	-.65	-.62	-.68	-.68	-.81	-.91	-1.00
.25	-.95	-.89	-.80	-.71	-.69	-.69	-.71	-.71	-.71	-.77	-.95	-1.00
.35	-.67	-.63	-.57	-.51	-.47	-.47	-.51	-.54	-.57	-.60	-.67	-.73
.45	-.42	-.39	-.35	-.32	-.32	-.32	-.39	-.42	-.39	-.46	-.49	-.53
.60	-.29	-.26	-.26	-.22	-.26	-.26	-.26	-.26	-.32	-.29	-.36	-.46
.75	-.31	-.27	-.27	-.24	-.24	-.24	-.35	-.35	-.35	-.35	-.35	-.42
.90	-.05	-.02	-.02	-.02	0.00	-.02	-.05	-.07	-.05	-.05	-.07	-.07
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-.01	.49	.72	.84	.91	.91	.93	.91	.93	.86	.84	.58
.01	.89	.92	.92	.83	.68	.62	.65	.59	.68	.89	.92	.95
.02	1.01	.78	.55	.36	.25	.13	.06	.09	.13	.32	.63	.78
.05	.25	.10	-.11	-.26	-.33	-.41	-.48	-.44	-.33	-.15	.06	.25
.10	.04	-.04	-.20	-.29	-.36	-.26	-.26	-.39	-.36	-.23	-.11	.26
.15	0.00	-.10	-.20	-.26	-.40	-.33	-.36	-.30	-.30	-.16	-.06	.03
.20	-.07	-.17	-.20	-.30	-.30	-.36	-.40	-.33	-.24	-.20	-.07	-.01
.25	-.17	-.25	-.28	-.30	-.36	-.33	-.38	-.33	-.30	-.25	-.14	-.06
.35	-.16	-.25	-.28	-.28	-.31	-.34	-.28	-.25	-.16	-.13	-.10	-.05
.45	-.20	-.27	-.30	-.33	-.33	-.30	-.27	-.27	-.24	-.17	-.07	-.04
.60	-.22	-.30	-.30	-.30	-.30	-.30	-.30	-.22	-.19	-.11	-.07	-.07
.75	-.11	-.14	-.14	-.14	-.11	-.11	-.11	-.06	-.03	0.00	.02	.05
.90	-.03	-.06	-.06	-.03	-.03	-.03	-.03	.02	.04	.04	.04	.04
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 67 K = .0321 DELT AA = 6.02 MEAN AA = 13.80

AA / X/C	13.80	15.35	16.80	18.05	19.01	19.61	19.81	19.61	19.01	18.05	16.81	15.35
UPPER SURFACE												
.00	-4.95	-6.06	-6.78	-7.31	-1.91	-1.72	-.71	-.46	-.32	-.27	-.22	-.18
.01	-7.86	-9.23	-9.74	-9.44	-1.97	-1.92	-.75	-.70	-.65	-.81	-.91	-.91
.02	-5.93	-6.64	-6.99	-6.60	-1.65	-1.46	-.51	-.51	-.51	-.59	-.83	-.51
.05	-3.77	-4.05	-4.23	-3.86	-1.53	-1.19	-.76	-.70	-.64	-.67	-.64	-.55
.10	-2.48	-2.71	-2.67	-2.18	-1.41	-1.11	-.84	-.77	-.73	-.69	-.62	-.69
.15	-2.34	-2.45	-2.45	-1.92	-1.32	-1.15	-.79	-.55	-.67	-.55	-.43	-.37
.20	-1.56	-1.66	-1.63	-1.31	-1.63	-1.12	-.81	-.75	-.65	-.68	-.65	-.65
.25	-1.34	-1.40	-1.34	-1.13	-1.56	-1.13	-.91	-.70	-.61	-.67	-.58	-.67
.35	-1.01	-1.01	-.97	-.97	-1.46	-1.10	-1.01	-.75	-.71	-.68	-.58	-.75
.45	-.69	-.73	-.73	-1.01	-1.36	-1.08	-1.12	-.76	-.73	-.69	-.55	-.76
.60	-.42	-.46	-.46	-.76	-1.10	-.80	-1.14	-.80	-.73	-.73	-.56	-.59
.75	-.23	-.27	-.42	-.64	-.93	-.75	-1.15	-.82	-.78	-.71	-.60	-.49
.90	.23	.16	-.03	-.23	-.36	-.36	-.60	-.50	-.50	-.40	-.26	-.09
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-4.95	-6.06	-6.78	-7.31	-1.91	-1.72	-.71	-.46	-.32	-.27	-.22	-.18
.01	-.89	-1.76	-2.10	-2.32	-.14	.07	.42	.60	.70	.76	.79	.76
.02	.76	.56	.48	.40	.92	.96	1.16	1.12	1.08	1.12	1.08	1.08
.05	1.13	1.13	1.13	1.13	1.13	1.09	1.09	.97	.94	.97	.90	.54
.10	.90	.93	.96	1.00	.90	.86	.83	.76	.66	.63	.60	.66
.15	.71	.75	.75	.82	.75	.68	.68	.58	.51	.40	.44	.47
.20	.63	.67	.67	.70	.67	.57	.57	.47	.40	.34	.34	.40
.25	.43	.51	.51	.51	.45	.43	.37	.31	.26	.20	.23	.26
.35	.28	.34	.37	.37	.31	.25	.22	.19	.10	.07	.07	.13
.45	.25	.29	.25	.29	.19	.16	.12	.06	0.00	-.03	0.00	.09
.60	.24	.24	.24	.24	.16	.16	.05	.01	.01	-.06	-.06	.09
.75	.15	.15	.09	.09	.03	-.02	-.08	-.11	-.17	-.14	-.14	-.02
.90	-.10	-.08	.03	.03	-.05	-.10	-.16	-.22	-.27	-.27	-.22	-.05
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 67   K = .0321   DELT AA = 6.02   MEAN AA = 13.80

AA	13.80	12.24	10.79	9.54	8.58	7.98	7.78	7.98	8.58	9.54	10.78	12.23
X/C												
						UPPER SURFACE						
.00	-.37	-1.77	-7.98	-1.96	-1.33	-.90	-.80	-.99	-.99	-.95	-2.63	-3.55
.01	-1.21	-4.16	-4.92	-4.36	-3.65	-3.24	-3.09	-3.09	-3.55	-4.31	-5.32	-6.44
.02	-.83	-3.58	-4.01	-3.73	-3.22	-2.99	-2.91	-2.95	-3.30	-3.73	-4.40	-5.15
.05	-.64	-2.02	-2.76	-2.60	-2.45	-2.30	-2.23	-2.23	-2.42	-2.66	-3.00	-3.37
.10	-.73	-1.45	-1.91	-1.91	-1.72	-1.61	-1.61	-1.68	-1.72	-1.87	-2.10	-2.25
.15	-.49	-1.32	-1.86	-1.68	-1.62	-1.56	-1.56	-1.62	-1.56	-1.74	-2.04	-2.10
.20	-.75	-1.03	-1.25	-1.22	-1.19	-1.12	-1.12	-1.15	-1.15	-1.25	-1.37	-1.47
.25	-.67	-.98	-1.07	-1.C7	-1.04	-.98	-.98	-1.04	-1.04	-1.13	-1.19	-1.25
.35	-.71	-.81	-.81	-.78	-.81	-.84	-.75	-.78	-.84	-.88	-.97	-.97
.45	-.69	-.73	-.55	-.59	-.55	-.59	-.59	-.59	-.66	-.66	-.69	-.69
.60	-.70	-.49	-.36	-.39	-.39	-.39	-.42	-.36	-.39	-.42	-.46	-.49
.75	-.75	-.34	-.27	-.19	-.23	-.23	-.23	-.27	-.27	-.30	-.27	-.27
.90	-.36	.06	.30	.30	.33	.30	.30	.30	.30	.26	.26	.26
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-.37	-1.77	-7.98	-1.96	-1.33	-.90	-.80	-.99	-.99	-.95	-2.63	-3.55
.01	.70	.35	1.41	.35	.57	.70	.73	.70	.63	.38	.04	-.45
.02	1.04	1.16	1.04	1.08	1.12	1.08	1.08	1.08	1.08	1.12	1.04	.96
.05	.86	.90	.97	.90	.90	.82	.82	.82	.86	.94	1.05	1.16
.10	.56	.63	.66	.60	.56	.53	.50	.53	.53	.63	.80	.86
.15	.40	.47	.54	.47	.40	.40	.37	.37	.40	.47	.54	.68
.20	.34	.37	.44	.37	.27	.30	.27	.30	.34	.37	.47	.57
.25	.17	.20	.26	.23	.20	.14	.14	.14	.20	.23	.28	.40
.35	.07	.10	.19	.13	.10	.10	.07	.04	.10	.16	.22	.31
.45	0.00	.06	.12	.09	.06	.03	0.00	.06	.06	.12	.12	.22
.60	-.02	.09	.16	.13	.13	.13	.13	.13	.16	.13	.20	.32
.75	-.11	-.02	.09	.09	.12	.06	.09	.C9	.06	.09	.15	.18
.90	-.13	-.02	-.10	.14	.14	.14	.14	.17	.14	.14	.14	.17
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 68 K = .0497 DELT AA = 6.03 MEAN AA = 13.80

AA / X/C	13.80	15.36	16.81	18.06	19.02	19.62	19.82	19.62	19.02	18.06	16.81	15.36
UPPER SURFACE												
.00	-4.85	-5.67	-7.31	-7.79	-4.90	-2.01	-1.67	-.95	-.99	-.80	-1.52	-1.24
.01	-7.66	-9.23	-10.25	-10.66	-8.62	-4.16	-2.73	-1.11	-1.92	-1.92	-3.14	-2.94
.02	-5.89	-6.76	-7.30	-7.42	-6.32	-2.24	-1.89	-.95	-1.22	-1.02	-1.77	-1.65
.05	-3.71	-4.17	-4.48	-4.41	-3.46	-1.53	-1.37	-.98	-.98	-.85	-1.10	-1.01
.10	-2.52	-2.75	-2.94	-2.82	-1.99	-1.57	-1.30	-1.00	-.92	-.81	-1.03	-.92
.15	-2.45	-2.69	-2.81	-2.51	-1.92	-1.86	-1.50	-1.09	-.79	-.79	-1.15	-.73
.20	-1.59	-1.69	-1.78	-1.63	-1.50	-1.66	-1.19	-1.03	-.78	-.78	-1.15	-.84
.25	-1.44	-1.53	-1.56	-1.44	-1.50	-1.77	-1.28	-.98	-.88	-.85	-1.01	-.88
.35	-1.04	-1.10	-1.14	-1.07	-1.30	-1.69	-1.40	-1.07	-.97	-.88	-.78	-.84
.45	-.76	-.80	-.84	-.84	-1.19	-1.51	-1.40	-1.05	-1.05	-1.01	-.76	-.91
.60	-.49	-.49	-.53	-.70	-.97	-1.07	-1.10	-.97	-.87	-1.17	-.73	-1.04
.75	-.34	-.30	-.45	-.64	-.82	-.71	-.71	-.93	-.86	-.93	-.82	-1.15
.90	.20	.06	0.00	-.19	-.33	-.16	-.26	-.53	-.40	-.43	-.43	-.43
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-4.85	-5.67	-7.31	-7.79	-4.90	-2.01	-1.67	-.95	-.99	-.80	-1.52	-1.24
.01	-1.07	-1.73	-2.32	-2.63	-.89	-.51	.01	.32	1.13	.35	.26	.38
.02	.80	.64	.32	.28	.68	.84	.96	1.00	1.04	1.16	1.04	1.04
.05	1.13	1.09	1.13	1.13	1.13	1.09	1.09	1.05	1.05	1.01	.97	.97
.10	.86	.93	.96	.93	.96	.90	.86	.76	.80	.73	.73	.70
.15	.68	.78	.78	.75	.82	.71	.68	.61	.61	.68	.58	.54
.20	.60	.67	.67	.73	.73	.67	.60	.50	.50	.47	.40	.44
.25	.48	.48	.51	.54	.54	.48	.43	.34	.31	.31	.28	.26
.35	.31	.37	.37	.37	.37	.31	.28	.19	.19	.19	.19	.10
.45	.25	.25	.22	.32	.29	.19	.19	.06	.09	.09	.06	.03
.60	.24	.24	.24	.24	.24	.20	.16	-.02	.05	.09	.13	.05
.75	.15	.18	.15	.12	.09	0.00	0.00	-.11	-.08	-.05	-.02	-.05
.90	.14	.14	.08	.03	-.02	-.13	-.08	-.25	-.16	-.13	-.16	-.10
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 68 K = .0497 DELT AA = 6.03 MEAN AA = 13.80

AA / X/C	13.80	12.24	10.78	9.53	8.57	7.97	7.77	7.97	8.57	9.53	10.78	12.23
UPPER SURFACE												
.00	-.42	-.22	-.99	-1.14	-.80	-.90	-.80	-.80	-1.04	-1.81	-2.63	-3.60
.01	-1.52	-1.52	-3.09	-3.45	-3.39	-3.19	-3.09	-3.04	-3.55	-4.00	-4.97	-6.09
.02	-.75	-.83	-2.75	-3.22	-3.10	-3.03	-2.91	-2.91	-3.22	-3.58	-4.28	-4.91
.05	-.70	-.70	-2.05	-2.42	-2.36	-2.26	-2.23	-2.26	-2.42	-2.57	-2.91	-3.25
.10	-.81	-.77	-1.53	-1.76	-1.76	-1.72	-1.72	-1.68	-1.76	-1.91	-2.10	-2.29
.15	-.67	-.67	-1.03	-1.32	-1.56	-1.56	-1.50	-1.62	-1.62	-1.80	-1.98	-2.10
.20	-.75	-.62	-.90	-1.15	-1.15	-1.15	-1.15	-1.15	-1.19	-1.28	-1.44	-1.44
.25	-.79	-.64	-.73	-1.04	-1.04	-1.04	-1.04	-1.04	-1.07	-1.16	-1.22	-1.31
.35	-.81	-.55	-.52	-.81	-.81	-.84	-.81	-.81	-.84	-.88	-.94	-1.04
.45	-.76	-.52	-.41	-.59	-.62	-.62	-.62	-.66	-.62	-.62	-.73	-.73
.60	-.87	-.73	-.25	-.39	-.39	-.42	-.42	-.42	-.42	-.46	-.46	-.46
.75	-.86	-.86	-.27	-.23	-.34	-.27	-.30	-.27	-.05	-.27	-.30	-.27
.90	-.46	-.23	.06	.26	.30	.26	.26	.30	.30	.26	.23	.23
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-.42	-.22	-.99	-1.14	-.80	-.90	-.80	-.80	-1.04	-1.81	-2.63	-3.60
.01	.63	.79	.63	.57	.60	.67	.76	1.01	.60	.38	.07	-.45
.02	1.04	1.04	1.04	1.08	1.12	1.08	1.04	1.08	1.04	1.00	1.30	.92
.05	.86	.78	.82	.82	.82	.82	.82	.82	.86	.90	.97	1.05
.10	.60	.46	.50	.50	.53	.46	.50	.50	.56	.60	.73	.76
.15	.40	.37	.37	.37	.68	.37	.37	.37	.40	.44	.54	.61
.20	.34	.24	.27	.27	.47	.27	.27	.27	.30	.27	.44	.50
.25	.14	.11	.11	.11	.14	.11	.17	.11	.17	.20	.28	.37
.35	.04	.07	.04	.04	.07	.16	.04	.07	.10	.10	.19	.25
.45	-.03	-.06	-.03	0.00	.09	.03	.03	.03	.09	.09	.19	.19
.60	-.02	-.02	.01	.09	.09	.13	.09	.09	.1[illegible]	.13	.20	.24
.75	-.11	-.08	-.05	.06	.18	.06	.06	.03	.06	.12	.12	.15
.90	-.10	-.10	0.00	.08	.11	.11	.11	.14	.14	.11	.14	.14
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 69   K = .0754   DELT AA = 6.04   MEAN AA = 13.80

AA / X/C	13.80	15.36	16.81	18.07	19.03	19.63	19.83	19.63	19.03	18.07	14.82	13.36
UPPER SURFACE												
.00	-4.66	-5.81	-7.31	-8.22	-8.66	-4.51	-1.81	-1.33	-2.10	-1.86	-1.72	-1.33
.01	-7.56	-9.03	-10.30	-11.16	-10.91	-2.63	-1.57	-1.52	-3.19	-3.29	-3.19	-3.09
.02	-5.85	-6.68	-7.46	-7.89	-7.58	-2.32	-1.42	-1.42	-1.81	-1.73	-1.77	-1.73
.05	-3.80	-4.14	-4.60	-4.72	-4.38	-2.17	-1.71	-1.44	-1.47	-1.40	-1.19	-1.04
.10	-2.60	-2.86	-3.01	-3.05	-2.52	-2.21	-1.83	-1.49	-1.41	-1.26	-1.11	-1.00
.15	-2.34	-2.57	-2.75	-2.69	-2.28	-2.40	-1.98	-1.50	-1.32	-1.09	-1.26	-.79
.20	-1.63	-1.72	-1.85	-1.75	-1.56	-1.85	-1.66	-1.41	-1.37	-1.12	-1.25	-.84
.25	-1.50	-1.56	-1.62	-1.56	-1.50	-1.68	-1.56	-1.44	-1.37	-1.19	-1.19	-1.01
.35	-1.14	-1.20	-1.20	-1.07	-1.27	-1.56	-1.53	-1.46	-1.30	-1.23	-.88	-.97
.45	-.87	-.87	-.84	-.87	-1.05	-1.51	-1.51	-1.58	-1.19	-1.22	-.87	-1.08
.60	-.56	-.56	-.56	-.59	-.93	-1.31	-.93	-.97	-.87	-1.07	-.87	-1.10
.75	-.38	-.38	-.42	-.53	-.67	-1.23	-.78	-.60	-.64	-.97	-.71	-1.01
.90	.13	.10	-.03	-.16	-.43	-.60	-.50	-.40	-.36	-.43	-.23	-.33
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-4.66	-5.81	-7.31	-8.22	-8.66	-4.51	-1.81	-1.33	-2.10	-1.86	-1.72	-1.33
.01	-.95	-1.70	-2.45	-2.88	-3.07	-.95	-.14	.13	.01	.10	.26	.42
.02	.84	.60	.40	.20	.16	.76	.96	1.00	1.18	1.00	1.04	1.04
.05	1.09	1.09	1.16	1.09	1.13	1.16	1.16	1.01	1.35	1.05	1.01	.97
.10	.83	.93	.96	1.03	1.03	1.03	.93	.80	.80	.76	.73	.70
.15	.68	.78	.82	.89	.89	.85	.75	.68	.65	.68	.61	.61
.20	.63	.67	.73	.77	.77	.77	.67	.57	.54	.50	.47	.47
.25	.40	.45	.54	.57	.57	.57	.48	.40	.37	.34	.34	.28
.35	.31	.31	.40	.43	.46	.43	.34	.22	.22	.19	.19	.19
.45	.22	.29	.25	.32	.35	.29	.19	.12	.09	.09	.12	.09
.60	.20	.32	.32	.28	.32	.28	.16	.09	.09	.05	.09	.09
.75	.18	.18	.15	.18	.15	.12	.06	-.08	-.05	-.05	.03	0.00
.90	.17	.17	.11	.11	.06	0.00	-.05	-.16	-.10	-.10	0.00	-.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 69   K = .0754   DELT AA = 6.04   MEAN AA = 13.80

AA	13.80	12.23	10.78	9.53	8.57	7.96	7.76	7.96	8.56	9.52	10.77	12.23
X/C												
						UPPER SURFACE						
.00	-.13	-1.19	-1.81	-2.59	-3.79	-4.80	-.46	-.90	-.99	-.99	-.75	-.80
.01	-.86	-3.60	-4.26	-5.27	-6.34	-7.81	-1.87	-2.99	-3.24	-3.14	-3.09	-2.99
.02	-.55	-3.26	-3.81	-4.24	-5.15	-5.97	-1.06	-2.59	-3.07	-2.99	-2.95	-2.87
.05	-.64	-2.54	-2.76	-3.03	-3.40	-3.80	-.91	-1.80	-2.28	-2.23	-2.23	-2.20
.10	-.92	-1.57	-2.02	-2.21	-2.40	-2.60	-.96	-1.03	-1.61	-1.61	-1.61	-1.61
.15	-.73	-1.62	-1.80	-1.98	-2.10	-2.34	-.61	.03	-.79	-.79	-.79	-.61
.20	-.93	-1.28	-1.34	-1.41	-1.50	-1.63	-1.03	-.78	-1.12	-1.15	-1.19	-1.15
.25	-1.04	-1.16	-1.25	-1.31	-1.40	-1.50	-.91	-.70	-.85	-.91	-.91	-.91
.35	-.91	-.94	-.97	-1.01	-1.04	-1.10	-.58	-.84	-.75	-.78	-.84	-.84
.45	-.87	-.73	-.80	-.80	-.84	-.84	-.55	-.91	-.48	-.62	-.62	-.59
.60	-.90	-.49	-.53	-.53	-.53	-.53	-.80	-.66	-.36	-.49	-.49	-.49
.75	-1.04	-.38	-.34	-.38	-.34	-.34	-.75	-.53	-.27	-.27	-.27	-.27
.90	-.76	.23	.16	.20	.23	.20	-.36	-.13	.13	.23	.20	.20
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-.13	-1.19	-1.81	-2.59	-3.79	-4.80	-.46	-.90	-.99	-.99	-.75	-.80
.01	.79	.57	.38	.01	-.51	-1.04	.67	.57	.60	.63	.76	.67
.02	1.45	1.04	1.08	1.04	.96	.80	.92	1.00	.92	.92	.92	.96
.05	.86	.82	.94	1.05	1.09	1.13	.67	.67	.67	.67	.59	.67
.10	.50	.50	.60	.73	.80	.90	.36	.40	.36	.36	.33	.36
.15	.44	.37	.47	.54	.65	.65	.20	.20	.20	.13	.20	.20
.20	.34	.27	.34	.47	.54	.60	.14	.14	.14	.07	.14	.14
.25	.17	.14	.26	.31	.40	.45	.06	.06	.06	.08	.08	.08
.35	.07	.04	.13	.19	.25	.34	-.10	-.07	-.04	-.01	-.01	-.01
.45	0.00	.03	.09	.19	.25	.29	-.13	-.13	-.09	-.09	-.03	-.06
.60	-.02	.09	.13	.20	.24	.20	-.09	-.06	-.02	.01	.01	.05
.75	-.14	.06	.09	.15	.15	.18	-.17	-.11	-.08	-.02	0.00	0.00
.90	-.25	.14	.14	.17	.17	.17	-.25	-.10	-.05	0.00	0.00	.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 7C   K = .1027   DELT AA = 6.06   MEAN AA = 13.80

AA X/C	13.80	15.36	16.82	18.08	19.04	19.65	19.85	19.55	19.04	18.08	16.83	15.36
						UPPER SURFACE						
.00	-4.72	-6.14	-7.33	-8.29	-8.93	-7.67	-3.40	-1.93	-1.89	-1.93	-2.03	-2.16
.01	-7.67	-9.32	-10.61	-11.79	-12.05	-9.47	-2.94	-1.60	-1.96	-2.94	-3.61	-4.02
.02	-5.77	-6.54	-7.35	-7.85	-7.97	-6.23	-3.15	-1.65	-1.76	-1.91	-2.18	-2.61
.05	-3.66	-4.14	-4.44	-4.71	-4.62	-3.34	-2.98	-1.54	-1.51	-1.78	-1.57	-1.63
.10	-2.38	-2.77	-2.96	-3.01	-2.96	-1.92	-3.54	-1.33	-1.28	-.85	-1.25	-1.18
.15	-2.02	-2.17	-2.33	-2.28	-2.12	-2.02	-3.24	-1.62	-1.72	-1.16	-.91	-1.41
.20	-1.59	-1.65	-1.78	-1.65	-1.65	-1.74	-2.69	-1.59	-1.65	-1.27	-.99	-1.[illegible]
.25	-1.35	-1.47	-1.50	-1.53	-1.47	-1.65	-1.92	-1.59	-1.53	-1.28	-.98	-1.56
.35	-1.01	-1.07	-1.11	-1.04	-1.14	-1.47	-.91	-1.47	-1.40	-1.44	-1.31	-1.27
.45	-.83	-.90	-.87	-.87	-1.01	-1.28	-.66	-1.42	-1.21	-1.49	-1.28	-1.04
.60	-.56	-.56	-.56	-.56	-.73	-1.00	-.97	-1.03	-1.00	-.93	-.90	-.69
.75	-.39	-.39	-.42	-.46	-.71	-.90	-.75	-.93	-1.08	-.71	-.50	-.82
.90	-.17	-.23	-.31	-.34	-.52	-.78	-.81	-.60	-.78	-.43	-.8[illegible]	-.75
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-4.72	-6.14	-7.33	-8.29	-8.93	-7.67	-3.40	-1.93	-1.89	-1.93	-2.03	-2.16
.01	-1.10	-1.88	-2.56	-3.09	-3.40	-2.62	-.23	-.32	1.16	.08	.11	.1[illegible]
.02	.61	.34	.22	-.05	-.13	.06	.61	.75	.81	.85	.81	.89
.05	.94	.98	.94	.98	.96	.98	.96	.98	.94	.83	.83	.83
.10	.82	.93	.96	.96	.96	.96	.93	.86	.79	.72	.69	.69
.15	.58	.68	.75	.79	.70	.75	.72	.65	.62	.48	.48	.48
.20	.46	.55	.62	.65	.60	.71	.58	.52	.42	.39	.33	.33
.25	.38	.41	.50	.52	.55	.52	.44	.38	.33	.25	.22	.22
.35	.20	.29	.35	.38	.38	.35	.28	.20	.08	.08	.08	.02
.45	.19	.25	.29	.32	.29	.25	.22	.12	.06	0.00	.03	0.00
.60	.12	.15	.15	.19	.15	.15	.04	0.00	-.06	-.10	-.10	-.06
.75	.10	.10	.13	.13	.07	.04	-.01	-.07	-.13	-.16	-.16	-.04
.90	.02	.02	.02	.02	-.05	-.08	-.13	-.16	-.25	-.22	-.25	-.11
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 70 K = .1027 DELT AA = 6.06 MEAN AA = 13.00

AA	13.00	12.23	10.77	9.51	8.55	7.94	7.76	7.94	8.55	9.51	10.76	12.22
X/C												
						UPPER SURFACE						
.00	-.88	-1.48	-1.20	-1.34	-1.07	-.88	-.88	-1.02	-1.02	-2.03	-2.85	-3.76
.01	-3.09	-3.30	-3.87	-3.35	-3.25	-3.04	-2.97	-3.15	-3.76	-5.10	-5.56	-6.34
.02	-2.07	-2.18	-3.26	-2.99	-2.95	-2.86	-2.80	-2.99	-3.34	-4.15	-4.54	-5.19
.05	-1.36	-1.51	-2.26	-2.23	-2.26	-2.20	-2.20	-2.29	-2.53	-2.92	-3.10	-3.40
.10	-1.18	-1.37	-1.16	-1.33	-1.33	-1.37	-1.33	-.94	-1.66	-2.00	-2.10	-2.67
.15	-1.67	-1.31	-.80	-1.21	-1.21	-1.26	-1.26	-1.36	-1.46	-1.57	-1.72	-1.82
.20	-1.59	-.97	-.83	-1.05	-1.09	-1.15	-1.39	-1.21	-1.24	-1.31	-1.37	-1.49
.25	-1.41	-.89	-.65	-.83	-.92	-.95	-.95	-1.01	-1.04	-1.10	-1.19	-1.31
.35	-.43	-.84	-.61	-.58	-.68	-.71	-.71	-.78	-.78	-.64	-.91	-.97
.45	-.80	-.87	-.59	-.52	-.59	-.66	-.63	-.59	-.73	-.76	-.60	-.83
.60	-.66	-.86	-.66	-.35	-.35	-.42	-.42	-.49	-.49	-.52	-.56	-.56
.75	-.57	-.68	-.53	-.35	-.24	-.28	-.31	-.35	-.42	-.39	-.39	-.39
.90	-.46	-.20	-.20	-.11	-.20	-.08	-.08	-.14	-.14	-.14	-.14	-.14
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-.88	-1.48	-1.20	-1.34	-1.07	-.88	-.88	-1.02	-1.02	-2.03	-2.85	-3.76
.01	.48	.42	.42	.57	.67	.73	.73	.70	.54	.36	.01	-.44
.02	.93	.85	1.09	.93	.93	.97	.97	.97	.93	.92	.97	.81
.05	.79	.79	.87	.72	.68	.64	.60	.57	.68	.75	.83	.90
.10	.65	.55	.59	.48	.45	.45	.45	.42	.48	.55	.65	.76
.15	.41	.38	.62	.27	.27	.24	.27	.24	.27	.34	.44	.55
.20	.33	.23	.17	.17	.10	.13	.10	.10	.17	.23	.33	.39
.25	.19	.13	.11	.05	.05	.05	.08	.05	.08	.13	.25	.30
.35	.05	.02	.14	-.03	-.03	-.03	-.03	-.03	.02	.05	.14	.20
.45	0.00	0.00	-.03	-.06	-.06	0.00	-.03	-.09	0.00	.06	.06	.16
.60	-.06	-.06	-.10	-.06	-.06	-.06	-.02	-.06	-.02	0.00	.04	.12
.75	-.04	-.07	-.07	-.07	-.04	-.01	-.01	-.04	-.01	.01	.04	.07
.90	-.11	-.08	-.08	-.05	-.02	0.00	.02	-.02	0.00	.02	.02	.08
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 71 K = .1230 DELT AA = 6.07 MEAN AA = 13.80

AA X/C	13.80	15.37	16.83	18.09	19.05	19.66	19.86	19.66	19.05	18.09	16.83	15.37
UPPER SURFACE												
.00	-4.72	-6.19	-7.38	-8.70	-9.11	-9.30	-5.36	-1.61	-1.61	-1.34	-1.20	-.93
.01	-7.83	-9.27	-10.76	-12.05	-12.41	-11.69	-6.59	-1.14	-1.40	-1.09	-1.29	-1.24
.02	-5.89	-6.70	-7.51	-8.01	-8.08	-7.43	-3.34	-.95	-1.33	-.87	-1.06	-1.10
.05	-3.75	-4.14	-4.53	-4.74	-4.80	-4.17	-2.56	-1.04	-1.42	-1.10	-1.21	-1.16
.10	-2.58	-2.82	-3.11	-3.20	-3.15	-2.43	-2.72	-.65	-1.28	-.70	-.99	-.94
.15	-2.17	-2.33	-2.38	-2.48	-2.38	-2.17	-2.53	-1.26	-1.46	-1.01	-1.62	-1.16
.20	-1.68	-1.74	-1.87	-1.87	-1.84	-1.78	-1.81	-1.43	-1.37	-1.18	-1.84	-1.09
.25	-1.44	-1.53	-1.59	-1.56	-1.53	-1.65	-1.77	-1.62	-1.35	-1.19	-1.77	-.98
.35	-1.11	-1.14	-1.14	-1.17	-1.14	-1.37	-1.60	-1.77	-1.21	-1.37	-1.11	-1.07
.45	-.94	-.97	-.97	-.94	-.97	-1.28	-1.49	-1.70	-1.25	-1.18	-.87	-1.18
.60	-.63	-.56	-.59	-.63	-.66	-.80	-1.17	-1.48	-1.17	-.93	-.90	-.97
.75	-.46	-.50	-.46	-.53	-.64	-.75	-.90	-1.40	-1.19	-.79	-.82	-.57
.90	-.20	-.25	-.31	-.34	-.55	-.69	-.72	-1.10	-1.10	-.66	-.58	-.37
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-4.72	-6.19	-7.38	-8.70	-9.11	-9.30	-5.36	-1.61	-1.61	-1.34	-1.20	-.93
.01	-1.22	-1.88	-2.65	-3.31	-3.68	-3.65	-2.09	-.16	-.01	.23	.36	.45
.02	.53	.34	.14	-.13	-.24	-.24	.46	.69	.69	.77	.81	1.09
.05	.83	.83	.83	.87	.87	.83	.87	.87	.79	.87	.72	.68
.10	.76	.79	.86	.89	.93	.93	.89	.82	.65	.59	.65	.48
.15	.51	.58	.62	.79	.72	.68	.65	.58	.48	.41	.38	.31
.20	.39	.49	.52	.55	.58	.58	.58	.49	.33	.26	.20	.17
.25	.27	.36	.41	.41	.50	.47	.47	.36	.25	.16	.16	.08
.35	.14	.23	.26	.29	.32	.32	.26	.17	.05	.05	0.00	-.03
.45	.09	.16	.19	.25	.25	.19	.19	.06	-.03	0.00	0.00	-.09
.60	.04	.38	.08	.12	.08	.08	.06	-.06	-.10	-.10	-.21	-.21
.75	.01	.07	.10	.07	.04	-.01	-.04	-.13	-.25	-.28	-.22	-.22
.90	-.02	-.05	-.02	-.02	-.08	-.11	-.13	-.30	-.38	-.41	-.33	-.22
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 71 K = .1230 DELT AA = 6.07 MEAN AA = 13.80

AA X/C	13.80	12.23	10.76	9.50	8.54	7.93	7.73	7.93	8.54	9.50	10.76	12.22
						UPPER SURFACE						
.00	-.93	-1.11	-1.48	-1.07	-.97	-.88	-.93	-1.07	-1.29	-1.89	-2.62	-3.76
.01	-1.55	-3.15	-3.51	-3.20	-2.99	-2.84	-2.94	-3.09	-3.56	-4.23	-5.36	-5.82
.02	-1.26	-2.57	-3.03	-2.91	-2.76	-2.68	-2.72	-2.88	-3.22	-3.69	-3.49	-5.04
.05	-1.10	-1.54	-2.26	-2.20	-2.14	-2.11	-2.14	-2.23	-2.44	-2.62	-2.95	-3.31
.10	-.80	-.85	-1.23	-1.28	-1.23	-1.23	-1.18	-1.33	-1.52	-1.66	-2.00	-2.24
.15	-1.21	-1.06	-1.06	-1.26	-1.31	-1.26	-1.31	-1.26	-1.31	-1.62	-1.77	-1.92
.20	-1.24	-.99	-.93	-1.09	-1.09	-1.12	-1.12	-1.15	-1.21	-1.27	-1.37	-1.43
.25	-1.25	-.86	-.74	-.86	-.89	-.92	-.95	-.98	-1.04	-1.07	-1.19	-1.31
.35	-1.17	-.71	-.58	-.58	-.71	-.71	-.71	-.78	-.84	-.88	-.91	-1.01
.45	-.94	-.97	-.56	-.56	-.59	-.66	-.59	-.69	-.73	-.76	-.80	-.87
.60	-.69	-.66	-.56	-.42	-.35	-.46	-.42	-.49	-.32	-.52	-.52	-.59
.75	-.75	-.53	-.06	-.46	-.02	-.46	-.35	-.35	-.31	-.39	-.46	-.42
.90	-.55	-.37	-.31	-.20	-.14	-.17	-.17	-.14	-.17	-.17	-.14	-.20
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-.93	-1.11	-1.48	-1.07	-.97	-.88	-.93	-1.07	-1.29	-1.89	-2.62	-3.76
.01	.48	.45	.48	.54	.67	.67	.67	.64	.45	.29	-.01	-.57
.02	.69	.77	.77	.81	.81	1.09	.97	.85	.85	.85	.81	.69
.05	.87	.60	.53	.60	.60	.49	.53	.57	.60	.64	.75	.79
.10	.65	.59	.35	.32	.69	.42	.35	.38	.42	.48	.59	.62
.15	.38	.20	.17	.14	.10	.14	.17	.17	.20	.27	.34	.41
.20	.10	.07	.01	.01	.01	.04	.04	.07	.07	.17	.20	.39
.25	.02	0.00	-.02	-.02	-.02	-.02	.05	.02	.02	.11	.16	.25
.35	-.12	-.09	-.15	-.15	-.12	-.09	-.09	-.06	-.06	.02	.05	.11
.45	0.00	-.06	-.19	-.19	-.16	-.12	-.09	-.09	-.03	0.00	.03	.06
.60	-.25	-.21	-.25	-.10	0.00	-.10	-.17	-.10	-.06	-.06	-.02	0.00
.75	-.13	-.22	-.16	-.19	-.16	-.13	-.04	-.04	-.07	-.04	-.01	-.01
.90	-.25	-.22	-.22	-.22	-.11	-.08	-.02	-.02	-.02	-.05	-.02	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 72 K = .1989 DELT AA = 6.08 MEAN AA = 13.80

UPPER SURFACE

AA X/C	13.80	15.37	16.83	18.09	19.06	19.67	19.87	19.67	19.06	18.09	16.84	15.37
.00	-4.54	-5.46	-7.24	-8.43	-9.30	-8.93	-9.07	-6.55	-1.48	-1.66	-1.25	-1.07
.01	-7.31	-8.70	-10.45	-11.89	-11.99	-12.92	-11.69	-8.86	-1.09	-1.35	-1.55	-1.40
.02	-5.73	-6.43	-7.31	-8.01	-8.43	-8.51	-7.66	-5.35	-1.06	-1.26	-1.22	-1.14
.05	-3.57	-4.02	-4.47	-4.77	-4.98	-4.92	-4.17	-2.44	-1.54	-1.30	-1.30	-1.30
.10	-2.38	-2.72	-3.11	-3.25	-3.30	-3.20	-2.58	-2.10	-1.37	-.94	-1.04	-.89
.15	-1.82	-2.02	-2.38	-2.33	-2.63	-2.83	-2.53	-2.63	-1.82	-1.26	-1.36	-1.26
.20	-1.62	-1.65	-1.81	-1.87	-1.65	-1.87	-1.90	-1.90	-1.74	-1.40	-1.59	-1.21
.25	-1.38	-1.41	-1.53	-1.59	-1.65	-1.65	-1.83	-1.86	-1.65	-1.31	-1.71	-1.16
.35	-1.01	-1.07	-1.14	-1.17	-1.21	-1.24	-1.64	-1.67	-1.57	-1.44	-1.31	-1.17
.45	-.87	-.87	-.94	-.97	-.97	-1.04	-1.46	-1.77	-1.46	-1.35	-1.18	-1.32
.60	-.56	-.56	-.63	-.59	-.63	-.66	-.86	-1.17	-1.03	-1.17	-.83	-.80
.75	-.39	-.39	-.39	-.42	-.57	-.57	-.64	-1.19	-1.00	-1.00	-.75	-.42
.90	-.17	-.20	-.23	-.28	-.40	-.43	-.46	-.75	-.84	-.60	-.84	-.40
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

AA X/C	13.80	15.37	16.83	18.09	19.06	19.67	19.87	19.67	19.06	18.09	16.84	15.37
.00	-4.54	-5.46	-7.24	-8.43	-9.30	-8.93	-9.07	-6.55	-1.48	-1.66	-1.25	-1.07
.01	-1.07	-1.81	-2.56	-3.21	-3.74	-3.93	-3.49	-2.37	-.13	-.01	.23	.39
.02	.65	.42	.18	-.05	-.20	-.28	-.17	.18	.73	.81	.97	.81
.05	.94	.94	.90	.90	.90	.87	.90	.98	.90	.83	.87	.87
.10	.76	.79	.89	.89	.89	.96	.99	1.16	.82	.82	.59	.59
.15	.58	.65	.72	.68	.79	.79	.79	.72	.62	.72	.44	.38
.20	.42	.49	.55	.58	.62	.62	.62	.62	.46	.36	.30	.30
.25	.38	.41	.44	.47	.50	.64	.52	.47	.33	.25	.22	.22
.35	.23	.26	.29	.32	.32	.44	.35	.26	.17	.29	.02	-.09
.45	.19	.25	.22	.25	.25	.32	.29	.19	.09	.03	.09	0.00
.60	.12	.15	.12	.38	.12	0.00	0.00	0.00	-.06	-.10	-.10	-.10
.75	.10	.25	.16	.16	.07	.10	.16	-.04	-.01	-.13	-.13	-.13
.90	.02	0.00	0.00	-.02	-.05	-.05	-.08	-.13	-.27	-.30	-.36	-.27
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 72 K = .1589 DELT AA = 6.08 MEAN AA = 10.80

AA X/C	13.80	12.22	10.76	9.50	8.53	7.92	7.72	7.92	8.53	9.49	10.75	12.22
UPPER SURFACE												
.00	-1.43	-1.52	-1.52	-1.07	-.97	-.79	-.88	-1.02	-1.34	-1.93	-2.03	-3.49
.01	-3.35	-3.46	-3.66	-3.35	-3.04	-2.89	-2.84	-2.99	-3.35	-3.97	-4.74	-5.92
.02	-2.57	-2.88	-2.80	-2.95	-2.80	-2.72	-2.68	-2.76	-2.80	-3.46	-4.07	-4.69
.05	-1.48	-1.84	-2.23	-2.23	-2.20	-2.11	-2.11	-2.20	-2.35	-2.56	-2.80	-3.19
.10	-.80	-.70	-.94	-1.28	-1.28	-1.28	-1.18	-1.28	-1.47	-1.62	-1.90	-2.05
.15	-1.16	-1.16	-.96	-1.36	-1.16	-.60	-1.01	-1.26	-.60	-1.21	-1.26	-.60
.20	-1.27	-1.21	-.93	-1.02	-1.12	-1.09	-1.02	-1.15	-1.18	-1.27	-1.34	-1.02
.25	-1.25	-1.13	-.65	-.92	-.95	-.89	-1.01	-.95	-1.01	-1.10	-1.16	-1.10
.35	-1.04	-.84	-.55	-.58	-.68	-.68	-.68	-.78	-.81	-.81	-.91	-.81
.45	-.90	-.69	-.59	-.52	-.59	-.63	-.66	-.66	-.73	-.76	-.80	-.42
.60	-.66	-.39	-.46	-.35	-.35	-.42	-.42	-.46	-.52	-.32	-.56	-.49
.75	-.57	-.28	-.39	-.21	-.31	.26	-.35	-.35	-.39	-.39	-.42	-.39
.90	-.63	-.17	-.23	-.20	-.14	-.14	-.11	-.11	-.14	-.14	-.17	-.14
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-1.43	-1.52	-1.52	-1.07	-.97	-.79	-.88	-1.02	-1.34	-1.93	-2.03	-3.49
.01	.39	.42	.51	.60	.70	.73	.73	.64	.64	.29	-.07	-.44
.02	.97	.81	.85	1.09	.89	1.09	.89	1.36	1.09	.69	.81	1.16
.05	.68	.68	.68	.60	.60	.60	.57	.87	.64	.72	.79	1.35
.10	.48	.45	.42	.38	.35	.35	.28	.48	.45	.52	.65	.82
.15	.27	.20	.20	.27	.17	.62	.17	.20	.24	.38	.41	.62
.20	.13	.10	.04	.07	.04	.07	.07	.13	.10	.23	.62	.39
.25	.16	.02	0.00	.16	-.02	0.00	.02	.02	.16	.13	.22	.36
.35	-.09	-.09	-.09	-.09	-.12	-.09	-.06	-.03	0.00	.05	.14	.20
.45	.16	-.12	-.12	-.12	0.00	-.09	-.09	-.06	-.03	0.00	.09	.12
.60	-.10	-.10	-.13	0.00	-.13	-.10	.64	-.10	-.06	0.00	0.00	.08
.75	-.22	-.16	-.16	.10	-.07	-.04	-.04	-.04	-.04	-.01	-.01	.16
.90	-.25	-.13	-.13	-.11	-.05	-.02	-.02	-.02	0.00	0.00	-.02	.02
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 73   K = .1910   DELT AA = 6.11   MEAN AA = 13.80

AA	13.80	15.38	16.85	18.12	19.09	19.70	19.90	19.70	19.09	18.12	16.85	15.38
X/C												
						UPPER SURFACE						
.00	-4.21	-5.41	-6.98	-8.17	-9.27	-9.89	-9.03	-8.89	-2.97	-2.59	-1.54	-1.31
.01	-7.00	-8.61	-10.02	-11.38	-12.34	-12.75	-12.64	-10.07	-2.46	-2.36	-1.85	-1.75
.02	-5.52	-6.28	-7.22	-7.79	-8.24	-8.43	-8.02	-7.30	-2.53	-2.38	-1.51	-1.59
.05	-3.55	-3.94	-4.39	-4.73	-4.91	-4.94	-4.88	-4.03	-2.85	-2.52	-1.67	-1.85
.10	-2.04	-2.35	-2.49	-2.63	-2.72	-2.53	-2.58	-2.13	-2.31	-2.08	-1.13	-1.31
.15												
.20	-1.58	-1.74	-1.80	-1.93	-1.93	-1.93	-1.90	-1.90	-1.80	-1.80	-1.71	-1.24
.25	-1.32	-1.44	-1.50	-1.56	-1.59	-1.62	-1.62	-1.77	-1.47	-1.29	-1.44	-1.17
.35	-1.07	-1.13	-1.13	-1.17	-1.13	-1.23	-1.30	-1.52	-1.30	-1.00	-1.36	-1.20
.45	-.79	-.79	-.86	-.83	-.83	-.90	-.97	-1.07	-1.14	-.83	-.83	-1.04
.60	-.49	-.46	-.53	-.49	-.53	-.53	-.53	-.63	-.97	-.90	-.29	-.53
.75	-.43	-.40	-.40	-.43	-.40	-.51	-.51	-.36	-.43	-.69	-.43	-.43
.90	-.09	-.09	-.12	-.15	-.21	-.30	-.39	-.42	-.68	-1.00	-.36	-.33
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-4.21	-5.41	-6.98	-8.17	-9.27	-9.89	-9.03	-8.89	-2.97	-2.59	-1.54	-1.31
.01	-.91	-1.58	-2.34	-2.91	-3.55	-3.82	-3.82	-3.15	-1.00	-.25	-.16	.17
.02	.97	.77	.53	.33	.09	.01	-.02	.13	.85	1.08	1.48	1.16
.05	1.02	1.02	1.02	1.02	.98	.94	.94	.91	1.02	.94	.94	.91
.10	.71	.80	.84	.87	.84	.90	.87	.87	.80	.71	.64	.58
.15	.68	.79	.82	.86	.86	.89	.86	.86	.82	.68	.55	.55
.20	.64	.74	.77	.84	.84	.84	.87	.80	.71	.61	.51	.44
.25	.54	.62	.62	.68	.71	.71	.71	.65	.59	.48	.40	.34
.35	.38	.44	.56	.47	.50	.53	.50	.44	.41	.26	.17	.14
.45	.29	.33	.52	.39	.39	.39	.39	.33	.23	.13	.07	.04
.60	.30	.34	.49	.34	.34	.34	.30	.49	.19	.08	0.00	0.00
.75	.22	.25	.25	.22	.25	.22	.25	.10	.01	-.04	-.10	.16
.90	.21	.21	.21	.15	.12	.12	.10	.01	-.03	-.15	-.23	-.12
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 73 K = .1910 DELT AA = 6.11 MEAN AA = 13.80

AA X/C	13.80	12.22	10.74	9.48	8.50	7.89	7.69	7.89	8.50	9.47	10.74	12.21
						UPPER SURFACE						
.00	-1.40	-1.21	-1.35	-.45	-.45	-.45	-.45	-.49	-.78	-1.31	-2.16	-2.88
.01	-2.05	-2.81	-2.96	-3.11	-2.81	-2.56	-2.56	-2.61	-3.01	-3.36	-4.37	-5.74
.02	-1.78	-2.08	-2.91	-2.76	-2.57	-2.49	-2.49	-2.49	-2.31	-3.29	-3.40	-4.16
.05	-1.88	-1.28	-2.06	-2.09	-2.00	-1.97	-1.97	-2.03	-2.15	-2.49	-2.73	-3.12
.10	-1.45	-.82	-.59	-.95	-.50	-1.00	-1.04	-1.09	-1.22	-.45	-1.40	-1.40
.15												
.20	-1.46	-1.43	-.77	-.86	-.99	-1.08	-1.05	-1.11	-1.14	-1.24	-1.40	-1.18
.25	-1.14	-1.17	-.57	-.57	-.75	-.78	-.78	-.87	-.99	-1.02	-1.14	-1.08
.35	-.91	-.74	-.87	-.39	-.48	-.32	-.65	-.74	-.78	-.81	-.91	-.87
.45	-.55	-.44	-.62	-.37	-.30	-.33	-.51	-.55	-.51	-.62	-.33	-.44
.60	-.59	-.29	-.29	-.42	-.22	-.19	-.36	-.29	-.42	-.29	-.49	-.49
.75	-.54	-.43	-.43	-.43	-.25	-.25	-.25	-.32	-.29	-.32	-.40	-.32
.90	-.36	-.12	-.12	-.18	-.12	-.03	-.03	-.06	-.03	-.06	-.09	-.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-1.40	-1.21	-1.35	-.45	-.45	-.45	-.45	-.49	-.78	-1.31	-2.16	-2.88
.01	.29	.41	.44	.59	.68	.71	.74	.68	.62	.50	.14	-.22
.02	1.16	1.20	1.20	1.20	1.16	1.16	1.16	1.12	1.20	1.20	1.48	1.12
.05	.83	.80	.72	.72	.72	.61	.61	.65	.69	.72	.83	.91
.10	.48	.41	.38	.31	.31	.25	.28	.35	.38	.44	.54	.64
.15	.48	.41	.41	.38	.27	.27	.27	.31	.34	.48	.51	.58
.20	.38	.31	.28	.41	.21	.21	.21	.25	.31	.48	.44	.54
.25	.34	.22	.25	.17	.14	.14	.14	.17	.25	.34	.37	.48
.35	.11	.05	.05	0.00	.05	0.00	.02	.11	.11	.20	.17	.26
.45	0.00	-.02	-.02	.04	.04	-.02	0.00	.04	.07	.10	.13	.20
.60	0.00	-.03	.11	.60	.04	.04	.08	.08	.15	.19	.19	.19
.75	-.07	-.04	.25	.39	.04	.01	.04	.10	.13	.13	.13	.19
.90	-.09	-.01	-.01	-.01	.07	.10	.10	.12	.15	.12	.15	.18
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 74 K = .2247 DELT AA = 6.13 MEAN AA = 13.80

UPPER SURFACE

AA / X/C	13.80	15.38	16.86	18.13	19.10	19.72	19.92	19.72	19.10	18.13	16.86	15.38
.00	-4.45	-5.65	-6.93	-8.41	-9.22	-10.18	-10.27	-9.56	-8.17	-6.12	-4.50	-3.74
.01	-7.15	-8.76	-10.32	-11.59	-12.54	-13.10	-13.10	-12.44	-10.43	-8.31	-6.44	-6.14
.02	-5.56	-6.54	-7.37	-7.98	-8.40	-8.66	-8.58	-8.09	-6.92	-5.03	-3.82	-4.39
.05	-3.64	-4.12	-4.48	-4.88	-5.03	-5.09	-5.00	-4.67	-3.70	-2.12	-1.91	-2.34
.10	-2.63	-2.76	-2.94	-3.08	-3.12	-3.08	-3.03	-2.81	-2.26	-1.68	-1.72	-1.36
.15												
.20	-1.74	-1.80	-1.96	-1.99	-1.99	-2.02	-1.99	-1.99	-1.99	-1.74	-1.52	-1.21
.25	-1.38	-1.59	-1.65	-1.71	-1.74	-1.71	-1.77	-1.80	-1.89	-1.59	-1.44	-1.14
.35	-.97	-1.20	-1.26	-1.26	-1.26	-1.26	-1.36	-1.49	-1.65	-1.43	-1.13	-1.04
.45	-.86	-.90	-.93	-.97	-.97	-.97	-1.00	-1.18	-1.32	-1.11	-1.04	-1.04
.60	-.59	-.59	-.59	-.29	-.59	-.59	-.36	-.63	-.93	-.83	-.83	-.70
.75	-.43	-.43	-.47	-.43	-.43	-.54	-.58	-.62	-.80	-.80	-.80	-.36
.90	-.12	-.18	-.18	-.21	-.27	-.36	-.39	-.39	-.45	-.65	-.71	-.39
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

X/C	13.80	15.38	16.86	18.13	19.10	19.72	19.92	19.72	19.10	18.13	16.86	15.38
.00	-4.45	-5.65	-6.93	-8.41	-9.22	-10.18	-10.27	-9.56	-8.17	-6.12	-4.50	-3.74
.01	-.97	-1.67	-2.37	-3.09	-3.64	-3.94	-3.97	-3.55	-2.73	-1.82	-1.06	-.58
.02	.97	.73	.53	.21	.21	-.10	-.10	.09	.29	.61	.97	.97
.05	.94	.94	.91	.94	.98	.91	.94	.94	.94	.98	.94	.87
.10	.71	.74	.77	.84	.87	.87	.84	.84	.80	.74	.61	.54
.15	.72	.75	.79	.82	.86	.86	.86	.79	.82	.68	.62	.48
.20	.64	.67	.74	.74	.77	.80	.80	.77	.71	.61	.51	.41
.25	.54	.57	.59	.65	.65	.71	.65	.62	.57	.48	.37	.28
.35	.38	.41	.41	.44	.44	.41	.41	.41	.35	.26	.17	.08
.45	.23	.33	.33	.33	.33	.33	.33	.26	.20	.13	.07	-.05
.60	.60	.30	.30	.30	.26	.30	.26	.23	.15	.08	0.00	.04
.75	.25	.22	.19	.19	.19	.25	.10	.07	.01	-.07	-.10	-.13
.90	.15	.12	.12	.10	.12	.10	-.01	-.01	-.03	-.18	-.18	-.20
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 74   K = .2247   DELT AA = 6.13   MEAN AA = 13.80

AA / X/C	13.80	12.21	10.73	9.46	8.49	7.87	7.67	7.87	8.49	9.46	10.73	12.21
UPPER SURFACE												
.00	-2.50	-1.83	-1.31	.50	-.35	-.45	-.40	-.59	-.83	-1.35	-2.02	-3.02
.01	-5.38	-4.37	-3.72	-3.42	-2.91	-2.61	-2.66	-2.61	-3.11	-4.02	-4.83	-5.89
.02	-4.08	-3.48	-3.14	-2.95	-2.65	-2.61	-2.57	-2.68	-2.99	-3.52	-4.05	-4.95
.05	-2.64	-2.40	-2.31	-2.21	-2.12	-2.09	-2.09	-2.12	-2.37	-2.61	-2.97	-3.30
.10	-.95	-.63	-1.40	-1.36	-1.36	-1.36	-1.36	-1.40	-1.72	-1.86	-1.99	-2.35
.15												
.20	-.86	-.83	-1.02	-1.05	-1.08	-1.08	-1.18	-1.14	-1.27	-1.43	-1.49	-1.58
.25	-.78	-.60	-.78	-.87	-.93	-.96	-.99	-.99	-1.08	-1.17	-1.26	-1.38
.35	-.78	-.65	-.52	-.55	-.68	-.74	-.78	-.81	-.87	-.91	-1.00	-1.07
.45	-.90	-.51	-.48	-.37	-.48	-.58	-.55	-.55	-.65	-.72	-.79	-.79
.60	-.53	-.46	-.42	-.32	-.32	-.29	-.39	-.42	-.46	-.49	-.53	-.59
.75	-.54	-.43	-.51	-.40	-.32	-.25	-.36	-.40	-.36	-.43	-.51	-.40
.90	-.33	-.39	-.36	-.24	-.18	-.12	-.09	-.09	-.09	-.12	-.12	-.15
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-2.50	-1.83	-1.31	.50	-.35	-.45	-.40	-.59	-.83	-1.35	-2.02	-3.02
.01	-.16	.20	.41	.56	.68	.74	.77	.68	.62	.44	.14	-.37
.02	1.12	1.16	1.08	1.16	1.12	1.08	1.16	1.20	1.16	1.36	1.16	1.04
.05	.80	.80	.65	.57	.57	.57	.57	.72	.69	.76	.80	.87
.10	.48	.41	.31	.25	.25	.21	.21	.28	.38	.44	.51	.64
.15	.38	.38	.27	.24	.20	.24	.24	.31	.34	.41	.72	.62
.20	.31	.28	.21	.15	.15	.15	.18	.25	.25	.35	.44	.54
.25	.17	.14	.11	.08	.08	.08	.11	.17	.20	.28	.34	.42
.35	0.00	0.00	-.03	-.09	-.06	-.03	.05	.05	.11	.17	.23	.29
.45	-.08	-.08	-.08	-.12	-.12	-.08	0.00	0.00	.10	.10	.16	.23
.60	-.10	-.06	-.10	-.14	-.03	-.03	0.00	.08	.15	.15	.23	.26
.75	-.16	-.10	-.10	-.10	-.04	-.07	.01	.04	.10	.10	.16	.16
.90	-.18	-.12	-.03	-.06	-.01	.01	.10	.12	.12	.12	.15	.21
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 75 K = .2664 DELT AA = 6.17 MEAN AA = 13.80

AA	13.80	15.39	16.88	18.16	19.14	19.75	19.96	19.75	19.14	18.16	16.88	15.39
X/C												
						UPPER SURFACE						
.00	-3.98	-5.22	-6.46	-7.36	-8.98	-9.75	-10.13	-9.89	-9.03	-7.36	-5.88	-4.31
.01	-7.05	-8.41	-9.92	-10.43	-12.44	-12.90	-12.90	-12.49	-10.27	-9.62	-7.75	-6.44
.02	-5.48	-6.43	-7.15	-7.90	-8.43	-8.58	-8.43	-8.13	-7.41	-6.66	-5.29	-4.46
.05	-3.67	-4.09	-4.42	-4.79	-4.97	-5.03	-4.94	-4.70	-4.24	-3.67	-2.79	-2.46
.10	-2.49	-2.72	-2.94	-3.08	-3.21	-3.21	-3.12	-2.99	-2.49	-2.08	-1.36	-1.04
.15												
.20	-1.74	-1.83	-1.87	-1.96	-1.96	-1.99	-1.93	-1.93	-1.83	-1.77	-1.52	-1.14
.25	-1.47	-1.56	-1.62	-1.65	-1.68	-1.62	-1.68	-1.62	-1.65	-1.62	-1.50	-1.14
.35	-1.10	-1.17	-1.20	-1.23	-1.20	-1.23	-1.23	-1.26	-1.30	-1.33	-1.26	-1.04
.45	-.83	-.90	-.86	-.83	-.86	-.86	-.90	-.93	-1.11	-1.04	-1.18	-.97
.60	-.56	-.53	-.56	-.56	-.49	-.53	-.56	-.53	-.66	-.70	-.93	-.87
.75	-.43	-.47	-.40	-.40	-.36	-.40	-.43	-.43	-.47	-.32	-.43	-.43
.90	-.09	-.09	-.12	-.12	-.18	-.18	-.21	-.21	-.27	-.36	-.39	-.53
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-3.98	-5.22	-6.46	-7.36	-8.98	-9.75	-10.13	-9.89	-9.03	-7.36	-5.88	-4.31
.01	-.76	-1.61	-2.15	-2.88	-3.49	-3.82	-3.94	-3.73	-3.24	-2.34	-1.55	-.91
.02	1.04	.77	.57	.33	.01	-.06	-.10	.01	.13	.45	.73	.89
.05	0.98	.98	1.02	.98	.94	0.98	.98	.98	.94	.94	.98	.87
.10	.74	.77	.84	.90	.87	.90	.90	.84	.84	.80	.74	.61
.15	.79	.72	.86	.86	.92	.89	.89	.86	.82	.72	.68	.58
.20	.64	.71	.74	.84	.84	.84	.84	.77	.77	.71	.67	.51
.25	.54	.59	.65	.68	.71	.71	.71	.68	.62	.54	.48	.37
.35	.38	.41	.44	.47	.47	.50	.50	.44	.38	.32	.26	.17
.45	.29	.33	.33	.36	.33	.33	.33	.33	.26	.20	.13	.04
.60	.49	.38	.38	.38	.38	.38	.30	.30	.49	.19	.15	.04
.75	.25	.25	.22	.22	.22	.25	.19	.16	.10	.04	-.04	-.07
.90	.21	.21	.15	.15	.12	.12	.10	.04	.04	-.01	-.01	-.09
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 75 K = .2664 DELT AA = 6.17 MEAN AA = 13.80

AA X/C	13.80	12.20	10.71	9.43	8.45	7.84	7.63	7.83	8.45	9.43	10.71	12.20
UPPER SURFACE												
.00	-3.21	-.21	-1.73	-1.16	-.78	-.40	-.49	-.59	-.83	-1.21	-1.97	-2.83
.01	-5.48	-4.83	-4.12	-3.42	-3.01	-2.76	-2.81	-2.86	-3.36	-3.82	-4.98	-5.79
.02	-4.12	-3.78	-3.36	-2.91	-2.61	-2.61	-2.61	-2.61	-3.02	-3.40	-4.12	-4.80
.05	-2.46	-2.46	-2.37	-2.21	-2.09	-2.09	-1.85	-2.21	-2.40	-2.58	-2.76	-3.27
.10	-.95	-1.22	-1.40	-1.36	-1.31	-1.27	-1.36	-1.40	-1.40	-1.68	-1.99	-2.13
.15												
.20	-.93	-.80	-.83	-.96	-1.05	-1.05	-1.11	-1.14	-1.30	-1.33	-1.49	-1.58
.25	-.96	-.66	-.48	-.66	-.87	-.84	-.96	-1.02	-1.11	-1.14	-1.26	-1.35
.35	-.91	-.81	-.22	-.39	-.39	-.61	-.65	-.78	-.84	-.87	-.91	-.87
.45	-.44	-.76	-.33	-.37	-.26	-.41	-.48	-.55	-.62	-.69	-.44	-.51
.60	-.36	-.29	-.29	-.46	.14	.14	-.22	-.29	-.46	-.49	-.29	-.29
.75	-.69	-.47	-.54	-.58	-.32	.73	-.21	-.32	.03	-.47	-.32	-.32
.90	-.45	-.39	-.27	-.21	-.33	-.12	-.12	-.09	-.03	-.09	-.09	-.06
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-3.21	-.21	-1.73	-1.16	-.78	-.40	-.49	-.59	-.83	-1.21	-1.97	-2.83
.01	-.43	-.04	.29	.44	.62	.68	.71	.68	.65	.47	.14	-.28
.02	1.04	1.08	1.12	1.12	1.16	1.12	1.20	1.16	1.20	1.24	1.20	1.12
.05	.87	.80	.72	.69	.61	.57	.65	.65	.69	.80	.87	.94
.10	.54	.44	.38	.38	.31	.28	.25	.28	.41	.44	.54	.67
.15	.48	.41	.38	.48	.24	.24	.38	.48	.41	.41	.55	.65
.20	.38	.38	.28	.25	.18	.21	.21	.25	.28	.41	.44	.58
.25	.34	.22	.17	.34	.11	.11	.11	.17	.25	.28	.37	.48
.35	.05	.02	0.00	-.03	-.03	-.03	0.00	.05	.11	.17	.23	.32
.45	-.02	-.08	-.08	-.08	-.08	-.08	-.02	0.00	.04	.13	.16	.23
.60	0.00	-.03	0.00	-.03	0.00	.04	.08	.11	.19	.23	.26	.30
.75	-.16	-.10	-.10	-.10	-.07	-.07	-.01	.04	.10	.13	.16	.19
.90	-.18	-.12	-.12	-.06	-.03	-.01	.04	.07	.12	.10	.12	.12
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 76   K = .0321   DELT AA = 6.02   MEAN AA = 18.00

AA / X/C	18.00	19.55	21.00	22.25	23.21	23.81	24.01	23.81	23.21	22.25	21.01	19.55
UPPER SURFACE												
.00	-7.40	-1.84	-2.22	-1.79	-1.09	-.90	-.85	-.71	-.76	-.57	-.52	-.38
.01	-11.01	-1.96	-2.71	-1.96	-1.38	-.90	-.79	-.79	-.74	-.69	-.79	-.63
.02	-7.70	-1.52	-2.10	-1.69	-1.27	-.57	-.57	-.53	-.57	-.48	-.48	-.36
.05	-4.49	-1.71	-1.49	-1.40	-1.37	-.93	-.90	-.87	-.84	-.81	-.81	-.71
.10	-2.74	-1.47	-1.09	-1.03	-.76	-.42	-.37	-.37	-.31	-.26	-.26	-.09
.15	-2.18	-1.96	-1.47	-1.38	-1.20	-1.06	-1.02	-.97	-.97	-.93	-.93	-.75
.20	-1.62	-2.03	-1.39	-1.23	-1.10	-.97	-.91	-.88	-.81	-.81	-.78	-.69
.25	-1.43	-2.14	-1.43	-1.28	-1.16	-.98	-.92	-.89	-.86	-.86	-.84	-.75
.35	-1.04	-2.06	-1.37	-1.17	-1.00	-.90	-.81	-.81	-.77	-.84	-.77	-.71
.45	-.87	-1.77	-1.45	-1.19	-1.09	-1.01	-.62	-.87	-.80	-.84	-.62	-.69
.60	-.70	-1.16	-1.30	-1.05	-1.02	-.84	-.84	-.81	-.88	-.88	-.84	-.70
.75	-.67	-.86	-1.01	-1.01	-1.09	-.78	-1.05	-.90	-.90	-.94	-.97	-.78
.90	-.67	-.61	-.82	-.91	-.97	-1.09	-.97	-.91	-.91	-.91	-.85	-.79
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-7.40	-1.84	-2.22	-1.79	-1.09	-.90	-.85	-.71	-.76	-.57	-.52	-.38
.01	-2.52	-.32	-.23	0.00	.24	.34	.37	.40	.46	.53	.59	.62
.02	.28	.80	.80	.84	.92	.92	.96	.96	.96	.92	.96	.92
.05	.83	.87	.83	.83	.76	.80	.76	.76	.72	.69	.69	.65
.10	.83	.73	.77	.70	.73	.67	.67	.67	.63	.60	.60	.57
.15	.68	.64	.57	.57	.57	.54	.47	.54	.50	.43	.40	.40
.20	.58	.48	.42	.42	.45	.42	.42	.42	.42	.32	.32	.25
.25	.43	.34	.34	.26	.32	.26	.29	.26	.26	.18	.18	.18
.35	.26	.23	.17	.17	.17	.08	.14	.11	.11	.05	.02	.02
.45	.16	.09	.06	.06	0.00	0.00	0.00	.03	.03	-.13	-.06	-.09
.60	.06	-.04	-.08	-.08	-.12	-.16	-.16	-.12	-.16	-.23	-.23	-.19
.75	-.05	-.14	-.20	-.20	-.26	-.32	-.29	-.32	-.29	-.35	-.29	-.26
.90	-.16	-.28	-.36	-.36	-.45	-.53	-.47	-.47	-.45	-.59	-.39	-.45
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 76 K = .0321 DELT AA = 6.02 MEAN AA = 18.00

AA / X/C	18.00	16.44	14.99	13.74	12.78	12.18	11.98	12.18	12.78	13.74	14.98	16.43
UPPER SURFACE												
.00	-.43	-.47	-.47	-.38	-.76	-3.02	-3.44	-3.54	-3.96	-4.67	-5.56	-6.64
.01	-.69	-1.06	-1.22	-1.01	-2.28	-5.90	-6.43	-6.59	-7.23	-7.87	-9.04	-10.10
.02	-.40	-.53	-.57	-.57	-1.94	-4.80	-5.13	-5.34	-5.71	-6.09	-6.79	-7.33
.05	-.75	-.71	-.81	-.65	-.93	-3.16	-3.35	-3.22	-3.66	-3.81	-4.12	-4.37
.10	-.15	-.04	-.09	.06	-.65	-1.97	-1.97	-2.38	-2.30	-2.41	-2.58	-2.69
.15	-.35	-.80	-.80	-.75	-1.20	-1.69	-1.69	-1.78	-2.09	-2.00	-2.27	-2.27
.20	-.69	-.72	-.78	-.62	-1.26	-1.42	-1.52	-1.33	-1.49	-1.33	-1.74	-1.71
.25	-.72	-.75	-.81	-.69	-1.34	-1.25	-1.31	-1.31	-1.31	-1.40	-1.51	-1.54
.35	-.57	-.71	-.74	-.77	-1.20	-.94	-.48	-.81	-1.04	-1.07	-1.07	-1.07
.45	-.69	-.51	-.76	-.98	-1.12	-.69	-.51	-.62	-.84	-.51	-.87	-.62
.60	-.67	-.60	-.74	-1.05	-.81	-.25	-.25	-.43	-.53	-.43	-.43	-.53
.75	-.75	-.71	-.90	-.94	-.45	.22	.60	-.41	-.03	-.41	-.37	.22
.90	-.82	-.76	-.70	-.76	-.46	-.16	-.19	-.16	-.19	-.22	-.22	-.40
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-.43	-.47	-.47	-.38	-.76	-3.02	-3.44	-3.54	-3.96	-4.67	-5.56	-6.64
.01	.69	.69	.75	.75	.66	-.23	-.32	-.39	-.64	-1.05	-1.53	-2.11
.02	.84	.88	.92	.84	.80	.80	.72	.72	.72	.60	.48	.40
.05	.61	.61	.58	.54	.58	.69	.72	.69	.76	.76	.76	.80
.10	.47	.47	.50	.40	.40	.57	.63	.63	.67	.73	.73	.77
.15	.33	.33	.33	.26	.29	.43	.47	.43	.43	.54	.61	.61
.20	.22	.22	.19	.16	.16	.29	.35	.35	.38	.42	.48	.51
.25	.12	.09	.12	.06	.09	.20	.23	.23	.20	.29	.34	.37
.35	.02	.02	0.00	-.03	-.03	.11	.14	.11	.08	.14	.23	.23
.45	-.13	-.09	-.06	-.09	-.09	.03	.09	.06	.06	.09	.09	.12
.60	-.19	-.19	-.12	-.16	-.16	0.00	0.00	0.00	0.00	0.00	.02	0.00
.75	-.29	-.29	-.20	-.17	-.17	-.02	-.02	-.05	-.05	-.05	-.02	-.05
.90	-.39	-.33	-.30	-.30	-.19	-.05	-.05	-.05	-.08	-.08	-.08	-.13
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 77 K = .0497 DELT AA = 6.03 MEAN AA = 18.00

UPPER SURFACE

AA / X/C	18.00	19.56	21.01	22.26	23.22	23.82	24.02	23.82	23.22	22.26	21.01	19.56
.00	-8.06	-6.08	-2.97	-2.97	-2.97	-2.92	-2.83	-2.78	-2.31	-2.08	-2.64	-2.50
.01	-11.59	-9.73	-2.44	-2.44	-3.67	-3.08	-2.97	-3.45	-2.34	-2.18	-3.72	-4.78
.02	-7.95	-6.50	-2.19	-2.52	-2.81	-2.77	-2.72	-2.85	-2.31	-2.06	-3.26	-3.31
.05	-4.68	-3.56	-1.98	-2.98	-2.67	-2.20	-2.76	-2.63	-2.45	-2.20	-2.23	-2.08
.10	-2.85	-2.02	-1.69	-1.75	-1.25	-1.25	-1.36	-1.14	-1.64	-1.64	-1.25	-.81
.15	-2.45	-2.05	-2.00	-1.78	-1.56	-1.11	-1.51	-1.29	-1.38	-1.47	-1.20	-1.11
.20	-1.84	-1.71	-1.87	-1.55	-1.33	-1.36	-1.20	-1.20	-1.13	-1.10	-1.07	-1.04
.25	-1.63	-1.72	-1.81	-1.31	-1.10	-1.19	-1.07	-1.13	-.98	-.95	-.89	-.92
.35	-1.10	-1.50	-1.86	-.81	-1.00	-.94	-.90	-.90	-.81	-.81	-.74	-.74
.45	-.87	-1.23	-1.52	-1.30	-1.05	-1.05	-.87	-.94	-.62	-.69	-.76	-.69
.60	-.63	-.95	-1.23	-1.40	-1.12	-1.12	-.67	-.67	-.84	-.88	-.74	-.43
.75	-.60	-.82	-1.27	-1.24	-1.27	-1.39	-.94	-1.12	-.90	-.78	-.86	-.82
.90	-.52	-.79	-1.03	-.97	-1.06	-1.09	-1.03	-1.03	-1.09	-.94	-.85	-.85
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

LOWER SURFACE

AA / X/C	18.00	19.56	21.01	22.26	23.22	23.82	24.02	23.82	23.22	22.26	21.01	19.56
.00	-8.06	-6.08	-2.97	-2.97	-2.97	-2.92	-2.83	-2.78	-2.31	-2.08	-2.64	-2.50
.01	-2.90	-2.01	-.45	-.48	-.67	-.51	-.51	-.48	-.16	-.19	-.13	-.07
.02	.08	.28	.72	.80	.76	.72	.72	.84	.84	.84	.92	.84
.05	.87	.91	.91	.91	.87	.91	.83	.83	.83	.83	1.24	.76
.10	.90	.93	.80	.83	.83	.77	.80	.80	.73	.67	.67	.60
.15	.75	.78	.71	.68	.61	.61	.61	.61	.61	.54	.50	.47
.20	.68	.64	.55	.55	.51	.48	.48	.48	.51	.42	.35	.29
.25	.51	.51	.40	.43	.34	.34	.37	.32	.37	.26	.20	.26
.35	.41	.41	.23	.23	.23	.17	.23	.20	.17	.17	.08	.08
.45	.29	.29	.12	.06	.06	.06	.03	.06	.06	0.00	-.03	0.00
.60	.18	.18	0.00	-.04	-.04	-.08	-.04	-.08	-.08	-.12	-.16	-.12
.75	.06	0.00	-.14	-.20	-.23	-.23	-.26	-.23	-.20	-.26	-.23	-.26
.90	-.11	-.11	-.36	-.45	-.45	-.47	-.42	-.45	-.42	-.45	-.42	-.39
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 77 K = .0497 DELT AA = 6.03 MEAN AA = 18.00

AA X/C	18.00	16.44	14.98	13.73	12.77	12.17	11.97	12.17	12.77	13.73	14.98	16.43
							UPPER SURFACE					
.00	-2.17	-1.79	-1.56	-1.46	-.71	-1.65	-2.22	-3.11	-3.91	-4.76	-5.80	-7.02
.01	-4.68	-4.09	-3.77	-3.61	-3.56	-3.93	-4.73	-5.79	-6.75	-7.87	-8.88	-10.16
.02	-3.35	-3.10	-2.89	-2.69	-2.97	-3.31	-3.93	-4.43	-5.34	-5.96	-6.79	-7.41
.05	-1.98	-1.67	-1.92	-1.98	-2.11	-2.29	-2.73	-3.19	-3.44	-3.75	-4.15	-4.43
.10	-.70	-.87	-.70	-.15	-1.14	-.70	-1.42	-1.91	-2.19	-2.24	-2.58	-2.63
.15	-.80	-1.02	-.21	-.88	-1.20	-.75	-1.11	-1.78	-1.69	-2.00	-2.27	-2.36
.20	-.94	-.81	-.46	-.81	-.78	-.94	-1.10	-1.46	-1.55	-1.65	-1.74	-1.78
.25	-.89	-.92	-.81	-.86	-.81	-.81	-.81	-1.31	-1.37	-1.40	-1.51	-1.54
.35	-.74	-.71	-.64	-.71	-.74	-.71	-.71	-.97	-1.04	-1.07	-1.07	-1.17
.45	-.51	-.66	-.66	-.62	-.80	-.76	-.73	-.73	-.80	-.80	-.69	-.80
.60	-.43	-.74	-.43	-.74	-.88	-.88	-.60	-.43	-.50	-.50	-.50	-.50
.75	-.78	-.82	-.52	-.86	-.78	-.63	-.41	-.26	-.37	-.41	-.37	-.45
.90	-.88	-.85	-.82	-.91	-.82	-.46	-.34	-.22	-.19	-.19	-.28	-.34
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
							LOWER SURFACE					
.00	-2.17	-1.79	-1.56	-1.46	-.71	-1.65	-2.22	-3.11	-3.91	-4.76	-5.80	-7.02
.01	.08	.24	.40	.50	.50	.34	.15	-.23	-.61	-1.12	-1.63	-2.30
.02	.88	1.04	.96	.92	.88	.92	.88	.84	.76	.60	.44	.32
.05	.72	.69	.61	.65	.65	.61	.69	1.27	.83	.76	.83	.83
.10	.57	.53	.53	.50	.47	.43	.53	.63	.70	.77	.83	.87
.15	.40	.40	.33	.29	.33	.29	.40	.47	.54	.57	.71	.71
.20	.55	.25	.29	.19	.29	.19	.32	.32	.42	.48	.55	.58
.25	.15	.15	.12	.12	.09	.09	.18	.29	.32	.37	.46	.46
.35	.05	.08	.02	.02	-.06	0.00	.08	.17	.20	.23	.29	.35
.45	-.03	-.09	-.03	-.03	-.06	-.06	.03	.09	.16	.19	.19	.19
.60	-.16	-.08	-.14	-.16	-.12	-.12	0.00	.06	.10	.06	.18	.14
.75	-.26	-.23	-.23	-.17	-.17	-.14	-.05	0.00	.06	.03	.03	.03
.90	-.42	-.30	-.33	-.30	-.25	-.22	-.11	0.00	.03	-.02	-.02	-.05
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 78   K = .0754   DELT AA = 6.04   MEAN AA = 18.00

AA / X/C	18.00	19.56	21.01	22.27	23.23	23.83	24.03	23.83	23.23	22.27	21.02	19.56
UPPER SURFACE												
.00	-8.10	-9.00	-5.18	-1.79	-1.37	-1.32	-.95	-.90	-.90	-.80	-.66	-.52
.01	-11.75	-12.12	-2.44	-1.43	-1.22	-1.11	-.79	-.79	-.85	-.74	-.69	-.79
.02	-8.28	-8.28	-2.02	-1.31	-1.02	-.82	-.65	-.65	-.57	-.53	-.48	-.57
.05	-4.71	-4.56	-2.23	-1.46	-1.30	-1.18	-.93	-.96	-.93	-.87	-.84	-.84
.10	-2.85	-2.52	-2.24	-1.25	-1.09	-.81	-.42	-.48	-.53	-.31	-.20	-.26
.15	-2.00	-2.14	-2.68	-1.69	.09	-1.24	-.88	-.97	-1.02	-.80	-.88	-.44
.20	-1.81	-1.68	-2.51	-1.62	-1.20	-1.17	-.94	-.94	-.91	-.85	-.81	-.78
.25	-1.66	-1.51	-2.34	-1.57	-1.16	-1.13	-.89	-.95	-.95	-.89	-.84	-.86
.35	-1.14	-1.17	-1.80	-1.50	-1.10	-1.10	-.87	-.90	-.87	-.81	-.74	-.71
.45	-.69	-1.05	-1.55	-1.48	-1.16	-1.16	-.94	-.98	-.87	-.80	-.73	-.69
.60	-.43	-.74	-1.30	-1.68	-1.19	-1.19	-1.02	-.98	-.84	-.77	-.77	-.70
.75	.22	-.52	-.97	-1.76	-1.16	-1.27	-1.12	-1.01	-.90	-.78	-.82	-.71
.90	-.40	-.52	-.55	-.85	-1.15	-1.26	-1.03	-.97	-.91	-.85	-.82	-.67
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-8.10	-9.00	-5.18	-1.79	-1.37	-1.32	-.95	-.90	-.90	-.80	-.66	-.52
.01	-2.87	-3.32	-2.04	-.29	-.04	.08	.30	.34	.40	.50	.59	.62
.02	.08	-.03	.52	.68	.72	.80	.84	.88	.88	.88	.88	.88
.05	.83	.83	.91	.83	.76	.72	.72	.72	.72	.69	.61	.61
.10	.90	.93	.90	.83	.70	.73	.67	.63	.63	.57	.50	.40
.15	.75	.78	.78	.68	.57	.57	.50	.47	.43	.43	.36	.26
.20	.64	.74	.68	.58	.48	.45	.35	.38	.32	.29	.22	.16
.25	.60	.54	.60	.37	.29	.29	.20	.20	.18	.15	.12	.06
.35	.35	.41	.41	.23	.14	.11	.05	.05	.02	.02	0.00	-.06
.45	.29	.25	.25	.06	-.03	-.03	-.06	-.06	-.09	-.13	-.19	-.19
.60	.14	.14	.10	-.04	-.16	-.16	-.19	-.23	-.27	-.23	-.27	-.31
.75	.21	.06	.03	-.23	-.35	-.29	-.35	-.35	-.32	-.35	-.35	-.35
.90	-.08	-.08	-.13	-.45	-.59	-.53	-.56	-.56	-.53	-.50	-.50	-.47
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 78   K = .0754   DELT AA = 6.04   MEAN AA = 18.00

AA / X/C	18.00	16.43	14.98	13.73	12.77	12.16	11.96	12.16	12.76	13.72	14.97	16.43
UPPER SURFACE												
.00	-.62	-1.09	-1.09	-1.27	-1.70	-2.08	-2.64	-2.83	-3.63	-4.52	-5.61	-6.88
.01	-1.27	-2.39	-3.08	-3.40	-3.93	-4.73	-5.37	-5.26	-6.91	-7.98	-9.25	-10.58
.02	-.82	-2.06	-2.52	-2.81	-3.31	-3.80	-4.43	-4.43	-5.46	-6.09	-6.83	-7.62
.05	-.81	-1.27	-1.80	-1.95	-2.33	-2.63	-3.04	-2.82	-3.53	-3.78	-4.06	-4.52
.10	-.26	-.37	-.87	-.98	-.87	-1.53	-1.91	-1.97	-1.97	-2.35	-2.52	-2.74
.15	-.93	-.71	-.97	-1.02	-1.11	-1.47	-1.69	-1.69	-1.69	-2.09	-2.27	-2.36
.20	-.81	-.56	-.69	-.75	-1.01	-1.17	-1.26	-1.10	-1.52	-1.62	-1.42	-1.78
.25	-.92	-.69	-.63	-.81	-.81	-.92	-1.22	-1.28	-1.40	-1.49	-1.54	-1.54
.35	-.61	-.61	-.57	-.74	-.64	-.48	-.48	-.64	-.90	-1.07	-1.07	-1.14
.45	-.62	-.73	-.62	-.51	-.51	-.26	-.26	-.44	-.51	-.80	-.84	-.62
.60	-.67	-.50	-.70	-.46	-.43	-.39	-.39	-.25	-.46	-.43	-.32	-.50
.75	-.67	-.48	-.71	-.48	-.52	-.33	-.03	-.03	-.14	-.03	-.33	-.37
.90	-.73	-.49	-.55	-.49	-.22	-.31	-.19	-.10	-.10	-.16	-.22	-.31
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-.62	-1.09	-1.09	-1.27	-1.70	-2.08	-2.64	-2.83	-3.63	-4.52	-5.61	-6.88
.01	.62	.56	.53	.46	.34	.21	-.04	-.19	-.51	-.99	-1.53	-2.23
.02	.88	.88	.88	.88	.88	.88	.88	.84	.80	.64	.56	.24
.05	.54	.54	.54	.61	.65	.65	.65	.72	.76	.80	.76	.83
.10	.40	.37	.37	.40	.47	.53	.53	.63	.67	.67	.77	.83
.15	.23	.23	.26	.26	.33	.33	.40	.43	.54	.61	.64	.75
.20	.09	.09	.12	.16	.22	.22	.29	.35	.38	.45	.51	.58
.25	.12	.01	.09	.09	.09	.15	.20	.23	.32	.34	.37	.43
.35	-.12	-.12	-.09	-.03	0.00	.05	.11	.14	.17	.23	.26	.32
.45	-.19	-.19	-.26	-.09	-.06	-.03	0.00	.09	.09	.12	.12	.22
.60	-.31	-.27	-.16	-.16	-.12	-.04	0.00	.02	.10	.06	.06	.14
.75	-.41	-.32	-.26	-.17	-.14	-.14	-.05	0.00	0.00	.03	.03	.09
.90	-.50	-.39	-.30	-.22	-.16	-.11	-.08	-.02	0.00	0.00	-.05	-.C5
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 79 K = .1027 DELT AA = 6.06 MEAN AA = 18.00

AA	18.00	19.56	21.02	22.28	23.24	23.85	24.05	23.85	23.24	22.28	21.03	19.56
X/C						UPPER SURFACE						
.00	-8.44	-9.83	-10.07	-1.98	-1.84	-1.46	-1.07	-.88	-.79	-.64	-.40	-.21
.01	-11.93	-12.73	-5.06	-1.60	-1.25	-1.20	-.95	-1.00	-.85	-.80	-.75	-.80
.02	-7.96	-8.07	-3.68	-1.34	-1.19	-1.26	-.94	-.94	-.83	-.68	-.54	-.72
.05	-4.88	-4.85	-3.08	-1.45	-1.27	-1.27	-.97	-1.03	-.87	-.75	-.72	-.69
.10	-3.13	-2.98	-3.03	-1.81	-1.47	-1.42	-.93	-.98	-.88	-.68	-.54	-.54
.15	-2.09	-2.05	-2.40	-1.70	-1.44	-1.35	-1.01	-1.01	-.92	-.74	-.74	-.66
.20	-1.80	-1.83	-2.47	-1.64	-1.42	-1.23	-.88	-.88	-.82	-.73	-.66	-.63
.25	-1.42	-1.58	-2.31	-1.58	-1.06	-1.15	-.81	-.81	-.72	-.57	-.48	-.48
.35	-1.19	-1.35	-2.21	-1.82	-1.12	-1.31	-1.09	-1.03	-.90	-.80	-.71	-.64
.45	-.83	-1.08	-1.89	-1.93	-1.33	-1.40	-1.22	-.94	-.87	-.80	-.69	-.62
.60	-.67	-.74	-1.59	-1.86	-1.42	-1.35	-1.25	-1.08	-.91	-.87	-.70	-.74
.75	-.53	-.57	-1.03	-1.67	-1.25	-1.18	-1.18	-.95	-.88	-.84	-.80	-.72
.90	.01	-.18	-.38	-1.20	-.82	-.76	-.89	-.69	-.55	-.52	-.59	-.35
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-8.44	-9.83	-10.07	-1.98	-1.84	-1.46	-1.07	-.88	-.79	-.64	-.40	-.21
.01	-3.07	-3.88	-3.80	-.8[illegible]	-.53	-.16	.05	.20	.33	.30	.48	.67
.02	.21	-.06	-.02	.77	.85	1.01	1.05	1.12	1.09	1.24	1.12	1.12
.05	1.01	1.01	1.05	1.05	.97	1.05	.97	.97	.97	.94	.86	.82
.10	.87	.94	.94	.81	.81	.78	.78	.68	.65	.61	.55	.48
.15	.76	.83	.83	.79	.73	.69	.59	.53	.49	.49	.39	.36
.20	.59	.66	.66	.63	.56	.50	.37	.28	.28	.31	.18	.18
.25	.59	.59	.62	.54	.45	.45	.34	.23	.26	.21	.13	.10
.35	.38	.41	.41	.35	.27	.18	.09	.06	.06	.03	-.01	-.07
.45	.34	.37	.37	.31	.18	.15	.06	.02	.02	.06	-.06	-.09
.60	.25	.29	.22	.15	.04	.04	-.03	-.06	-.10	-.03	-.17	-.17
.75	.09	.01	.03	-.07	-.22	-.24	-.36	-.33	-.33	-.30	-.30	-.36
.90	-.03	-.08	-.11	-.30	-.44	-.47	-.58	-.52	-.49	-.44	-.55	-.47
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 79   K = .1027   DELT AA = 6.06   MEAN AA = 18.00

AA X/C	18.00	16.43	14.97	13.71	12.75	12.14	11.94	12.14	12.75	13.71	14.96	16.42
							UPPER SURFACE					
.00	-.26	-.12	-.17	-.36	-.88	-1.31	-1.79	-2.51	-3.32	-4.19	-5.33	-6.77
.01	-.80	-1.20	-1.40	-1.84	-2.54	-3.77	-4.56	-5.36	-6.30	-7.43	-8.92	-10.30
.02	-.64	-.86	-1.23	-1.48	-2.76	-3.23	-3.77	-4.32	-4.94	-5.59	-6.39	-7.16
.05	-.66	-.69	-.81	-.94	-1.97	-2.34	-2.68	-2.98	-3.29	-3.69	-4.11	-4.54
.10	-.49	-.49	-.68	-1.03	-1.37	-1.81	-2.05	-2.20	-2.40	-2.64	-2.79	-2.98
.15	-.61	-.61	-.92	-1.01	-.79	-1.27	-1.53	-1.62	-1.83	-1.92	-2.09	-2.14
.20	-.57	-.57	-.76	-.79	-.44	-.98	-1.20	-1.26	-1.42	-1.49	-1.68	-1.77
.25	-.45	-.48	-.48	-.48	-.17	-.72	-.90	-1.00	-1.12	-1.21	-1.33	-1.39
.35	-.64	-.55	-.55	-.58	-.42	-.48	-.77	-.93	-.96	-1.03	-1.12	-1.15
.45	-.62	-.48	-.59	-.52	-.34	-.27	-.55	-.66	-.69	-.73	-.80	-.80
.60	-.63	-.60	-.74	-.46	-.50	-.22	-.29	-.50	-.46	-.46	-.57	-.57
.75	-.61	-.57	-.65	-.50	-.50	-.38	-.12	-.19	-.19	-.23	-.31	-.31
.90	-.28	-.25	.01	-.25	-.04	.39	.15	.32	.35	.28	.22	.15
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
							LOWER SURFACE					
.00	-.26	-.12	-.17	-.36	-.88	-1.31	-1.79	-2.51	-3.32	-4.19	-5.33	-6.77
.01	.67	.73	.73	.70	.51	.36	.17	-.03	-.44	-.87	-1.55	-2.21
.02	1.16	1.16	1.09	1.12	1.09	1.09	1.12	1.09	1.01	.93	.73	.53
.05	.79	.75	.67	.75	.75	.75	.86	.90	.97	1.01	.97	1.01
.10	.42	.48	.39	.36	.39	.45	.52	.58	.65	.71	.78	.81
.15	.29	.36	.19	.19	.22	.29	.39	.43	.49	.59	.63	.69
.20	.12	.09	.06	.02	.09	.06	.18	.28	.31	.40	.44	.53
.25	.07	.04	.04	.04	.07	.07	.18	.26	.26	.34	.37	.48
.35	-.07	-.07	-.10	-.10	-.04	-.01	.03	.03	.21	.24	.24	.32
.45	-.09	-.09	-.06	-.09	-.06	-.03	.06	.12	.18	.25	.25	.28
.60	-.24	-.10	-.17	-.14	-.06	-.03	0.00	.11	.18	.15	.18	.22
.75	-.33	-.30	-.27	-.30	-.24	-.19	-.10	-.01	.01	.01	.03	.03
.90	-.41	-.36	-.36	-.33	-.27	-.17	-.08	0.00	.02	0.00	-.03	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 80 K = .1284 DELT AA = 6.07 MEAN AA = 18.00

AA / X/C	18.00	19.57	21.03	22.29	23.25	23.86	24.06	23.86	23.25	22.29	21.03	19.57
UPPER SURFACE												
.00	-8.40	-9.93	-10.93	-7.20	-2.27	-2.03	-1.12	-1.07	-1.22	-.79	-.60	-.60
.01	-11.14	-12.28	-13.12	-6.59	-1.74	-1.69	-1.25	-1.00	-1.10	-1.00	-1.00	-1.25
.02	-7.56	-8.10	-8.25	-4.32	-1.88	-1.55	-1.19	-.94	-1.05	-.90	-.83	-1.05
.05	-4.67	-4.97	-4.88	-3.32	-1.88	-1.67	-1.27	-.94	-1.09	-.90	-.87	-1.03
.10	-3.13	-3.23	-3.03	-3.18	-2.25	-2.10	-1.52	-1.03	-1.17	-.93	-.83	-1.08
.15	-1.96	-2.01	-2.05	-2.53	-1.83	-1.70	-1.22	-.92	-1.05	-.92	-.74	-.92
.20	-1.83	-1.90	-1.99	-2.31	-1.77	-1.80	-1.30	-.92	-1.01	-.92	-.82	-.82
.25	-1.49	-1.55	-1.67	-2.10	-1.64	-1.67	-1.21	-.87	-.94	-.75	-.66	-.69
.35	-1.22	-1.25	-1.44	-2.08	-1.92	-1.98	-1.38	-1.03	-1.09	-.96	-.84	-.87
.45	-.90	-.94	-1.11	-1.68	-1.71	-1.89	-1.43	-1.08	-1.08	-.94	-.87	-.76
.60	-.60	-.63	-.77	-1.01	-1.83	-1.76	-1.69	-1.25	-1.11	-1.01	-.91	-.70
.75	-.34	-.46	-.57	-.84	-1.44	-1.52	-2.05	-1.52	-1.10	-.99	-.91	-.57
.90	-.15	-.28	-.38	-.45	-1.13	-1.09	-1.47	-1.30	-.72	-1.03	-.86	-.65
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-8.40	-9.93	-10.93	-7.20	-2.27	-2.03	-1.12	-1.07	-1.22	-.79	-.60	-.60
.01	-3.10	-3.88	-4.41	-2.24	-.81	-.72	-.10	.11	.11	.33	.45	.48
.02	.13	-.09	-.25	.37	.77	.85	1.05	1.09	1.09	1.05	1.09	1.09
.05	.97	.97	1.01	1.09	1.05	1.05	1.05	1.01	.97	.82	.82	.79
.10	.87	.94	.94	.97	.91	.84	.71	.71	.68	.58	.52	.45
.15	.73	.79	.83	1.03	.93	.76	.59	.56	.53	.43	.36	.29
.20	.56	.66	.69	.72	.63	.56	.40	.37	.34	.25	.18	.12
.25	.51	.59	.62	.62	.54	.48	.34	[illegible]	.26	.15	.10	.07
.35	.32	.35	.44	.41	.32	.24	.12		.12	.06	-.07	-.10
.45	.31	.31	.40	.40	.28	.25	.09	[illegible]	.06	-.03	-.09	-.16
.60	.18	.15	.22	.15	.11	.07	-.14	-.06	-.14	-.24	-.24	-.24
.75	.03	.06	.06	.03	-.13	-.13	-.33	-.30	-.30	-.30	-.36	-.36
.90	-.03	-.06	-.06	-.14	-.27	-.30	-.60	-.47	-.49	-.55	-.55	-.47
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 80 K = .1284 DELT AA = 6.07 MEAN AA = 18.00

AA / X/C	18.00	16.43	14.96	13.70	12.74	12.13	11.93	12.13	12.74	13.70	14.96	16.42
UPPER SURFACE												
.00	-.79	-.79	-.98	-.55	.54	-.88	-1.22	-.60	-2.27	-3.23	-4.52	-6.20
.01	-1.45	-1.99	-2.93	-2.83	-2.73	-2.83	-3.23	-3.97	-4.61	-5.70	-7.14	-8.72
.02	-1.12	-1.81	-2.43	-2.32	-2.39	-2.54	-2.61	-3.34	-3.45	-4.17	-5.38	-6.32
.05	-1.03	-1.09	-1.61	-1.64	-1.67	-1.85	-1.97	-2.31	-2.56	-3.01	-3.53	-4.08
.10	-1.03	-1.22	-1.03	-1.12	-1.17	-1.42	-1.56	-1.76	-2.01	-2.25	-2.59	-2.79
.15	-1.09	-1.01	-.74	-.70	-1.18	-.66	-.83	-1.01	-1.16	-1.35	-1.53	-1.66
.20	-.92	-.88	-.63	-.50	-.54	-.76	-.82	-.95	-1.01	-1.33	-1.49	-1.64
.25	-.72	-.72	-.51	-.42	-.29	-.48	-.51	-.63	-.72	-1.00	-1.18	-1.30
.35	-.77	-.77	-.64	-.61	-.48	-.61	-.68	-.71	-.64	-.84	-1.03	-1.06
.45	-.73	-.55	-.66	-.66	-.45	-.48	-.73	-.66	-.55	-.62	-.69	-.80
.60	-.60	-.70	-.60	-.57	-.50	-.40	-.63	-.60	-.60	-.50	-.50	-.53
.75	-.65	-.61	-.61	-.46	-.50	-.34	-.57	-.50	-.38	-.46	-.31	-.34
.90	-.52	-.38	-.35	-.45	-.45	-.38	-.18	-.35	-.45	-.15	-.21	-.21
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-.79	-.79	-.98	-.55	.54	-.88	-1.22	-.60	-2.27	-3.23	-4.52	-6.20
.01	.45	.51	.42	.54	.61	.58	.42	.20	0.00	-.47	-1.06	-1.96
.02	1.01	1.01	1.09	1.09	1.12	1.09	1.05	1.05	1.05	.97	.81	.57
.05	.75	.67	.71	.71	.71	.71	.75	.79	.82	.94	.97	1.01
.10	.39	.32	.39	.36	.36	.36	.45	.52	.58	.61	.71	.81
.15	.26	.19	.22	.16	.59	.26	.29	.29	.39	.46	.56	.63
.20	.09	0.00	0.00	0.00	.02	.09	.12	.09	.18	.28	.37	.44
.25	0.00	-.03	0.00	.02	.02	.07	.07	.10	.18	.29	.34	.40
.35	-.16	-.16	-.13	-.10	-.10	-.04	-.04	.01	.06	.12	.21	.30
.45	-.16	-.16	-.12	-.16	-.09	-.06	0.00	.02	.06	.15	.18	.25
.60	-.32	-.28	-.21	-.24	-.17	-.14	-.10	-.10	-.06	.04	.07	.11
.75	-.42	-.39	-.30	-.30	-.27	-.16	-.13	-.13	-.16	-.01	-.04	-.01
.90	-.47	-.41	-.36	-.33	-.27	-.22	-.19	-.19	-.17	-.08	-.08	-.08
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 81   K = .1589   DELT AA = 6.08   MEAN AA = 18.00

AA X/C	18.00	19.57	21.03	22.29	23.26	23.87	24.07	23.87	23.26	22.29	21.04	19.57
UPPER SURFACE												
.00	-8.21	-10.12	-11.27	-11.46	-3.42	-1.84	-1.31	-1.36	-1.41	-1.22	-1.12	-2.32
.01	-10.99	-12.83	-13.96	-12.48	-3.08	-1.84	-1.45	-1.30	-1.20	-1.15	-1.00	-1.25
.02	-7.38	-8.18	-8.54	-7.52	-3.12	-1.63	-1.34	-1.05	-1.08	-1.01	-.79	-.97
.05	-4.60	-5.03	-5.28	-3.87	-3.01	-1.64	-1.39	-1.12	-1.09	-1.06	-.84	-1.03
.10	-3.03	-3.28	-3.28	-2.79	-3.23	-1.86	-1.47	-1.27	-1.22	-.98	-.78	-1.03
.15	-2.23	-2.44	-2.57	-3.10	-3.32	-2.27	-1.88	-1.66	-1.79	-1.57	-1.35	-1.44
.20	-1.83	-1.96	-2.15	-2.56	-2.82	-1.77	-1.23	-1.07	-1.17	-.95	-.79	-.82
.25	-1.49	-1.61	-1.76	-2.10	-2.92	-1.82	-1.12	-1.00	-1.12	-.87	-.69	-.63
.35	-1.15	-1.31	-1.41	-1.70	-2.43	-2.08	-1.47	-1.22	-1.12	-1.06	-.99	-.74
.45	-.90	-.97	-1.08	-1.26	-1.71	-2.17	-1.40	-1.33	-1.15	-1.11	-1.01	-.66
.60	-.67	-.70	-.84	-.80	-1.08	-2.37	-1.69	-1.32	-1.11	-1.18	-.94	-.80
.75	-.34	-.46	-.57	-.65	-.69	-1.33	-2.17	-1.48	-1.06	-1.06	-.99	-.76
.90	.15	.01	-.15	-.25	-.38	-.72	-1.57	-1.33	-.89	-.72	-.65	-.52
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-8.21	-10.12	-11.27	-11.46	-3.42	-1.84	-1.31	-1.36	-1.41	-1.22	-1.12	-2.32
.01	-3.14	-4.03	-4.78	-4.47	-1.58	-.72	-.22	-.16	-.13	.05	.14	-.13
.02	.17	-.13	-.29	-.29	.49	.77	.93	.93	.97	1.01	1.01	1.01
.05	.97	1.01	.97	1.05	1.13	1.09	.97	.94	.97	.90	.90	.90
.10	.87	.94	1.04	1.00	1.00	.91	.71	.65	.68	.61	.58	.71
.15	.69	.79	.86	.96	.93	.79	.53	.56	.49	.46	.43	.36
.20	.59	.66	.69	.78	.72	.66	.37	.34	.31	.28	.21	.15
.25	.54	.59	.64	.73	.67	.51	.29	.29	.26	.18	.18	.13
.35	.38	.38	.47	.47	.47	.32	.09	.03	.15	-.01	-.01	-.04
.45	.37	.37	.44	.47	.44	.31	0.00	0.00	.06	-.06	-.03	-.06
.60	.07	.11	.15	.18	.15	-.21	-.35	-.32	-.24	-.35	-.35	-.35
.75	.09	.12	.09	.09	.03	-.19	-.45	-.30	-.30	-.39	-.36	-.16
.90	-.03	.02	-.03	-.03	-.08	-.38	-.82	-.60	-.47	-.55	-.49	-.52
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 81   K = .1589   DELT AA = 6.08   MEAN AA = 18.00

AA X/C	18.00	16.42	14.96	13.70	12.73	12.12	11.92	12.12	12.73	13.69	14.95	16.42
UPPER SURFACE												
.00	-1.55	-1.31	-1.31	-1.12	-.88	-.79	-1.17	-1.79	-2.61	-3.75	-5.14	-6.53
.01	-1.69	-1.69	-2.24	-2.73	-2.63	-2.68	-3.18	-4.17	-4.96	-6.15	-7.58	-9.12
.02	-1.41	-1.37	-1.81	-1.88	-2.21	-2.32	-2.76	-3.41	-4.10	-4.79	-5.70	-6.58
.05	-1.18	-.97	-1.21	-1.58	-1.67	-1.73	-2.07	-2.43	-2.83	-3.23	-3.72	-4.21
.10	-.98	-1.08	-.44	-.83	-1.08	-1.27	-1.66	-1.91	-2.20	-2.35	-2.69	-2.84
.15	-1.75	-1.53	-1.40	-1.01	-.96	-1.09	-1.18	-1.62	-1.83	-1.92	-2.18	-2.23
.20	-1.11	-.88	-.79	-.66	-.54	-.60	-.88	-1.07	-1.23	-1.42	-1.55	-1.74
.25	-.69	-.60	-.60	-.54	-.32	-.38	-.51	-.75	-1.00	-1.12	-1.30	-1.36
.35	-.77	-.64	-.58	-.68	-.55	-.48	-.58	-.64	-.90	-.99	-1.09	-1.15
.45	-.55	-.73	-.52	-.62	-.55	-.52	-.45	-.41	-.59	-.73	-.80	-.80
.60	-.67	-.70	-.46	-.63	-.74	-.53	-.12	-.46	-.36	-.50	-.53	-.57
.75	-.42	-.65	-.34	-.50	-.50	-.38	-.12	-.31	-.27	-.19	-.23	-.27
.90	-.25	-.21	-.11	-.08	-.08	-.21	-.01	.39	.05	.25	.25	.25
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-1.55	-1.31	-1.31	-1.12	-.88	-.79	-1.17	-1.79	-2.61	-3.75	-5.14	-6.53
.01	.48	.27	.33	.45	.54	.58	.42	.23	-.10	-.65	-1.31	-2.11
.02	1.09	1.05	1.09	1.05	1.16	1.09	1.05	1.09	.93	.97	.81	.53
.05	.86	.86	.75	.79	.67	.71	.82	.94	.94	.97	1.05	1.01
.10	.52	.52	.42	.39	.36	.29	.48	.52	.58	.71	.81	.81
.15	.39	.29	.29	.29	.26	.26	.29	.39	.46	.56	.69	.79
.20	.15	.15	.09	.09	.06	.02	.09	.15	.25	.37	.44	.50
.25	.07	.15	.07	.04	.02	.04	.04	.18	.26	.37	.43	.48
.35	-.07	-.01	-.04	-.07	-.10	-.07	-.04	.03	.12	.24	.30	.35
.45	-.06	-.06	-.06	-.09	-.06	-.06	0.00	.06	.12	.31	.31	.31
.60	-.32	-.21	-.28	-.28	-.28	-.28	-.24	-.06	0.00	.07	.07	.07
.75	-.33	-.22	-.27	-.30	-.24	-.22	-.22	-.07	-.04	.03	.06	.03
.90	-.36	-.33	-.33	-.36	-.33	-.27	-.19	-.06	.04	.02	.02	0.00
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 82   K = .1589   DELT AA = 6.08   MEAN AA = 18.00

AA / X/C	18.00	19.57	21.03	22.29	23.26	23.87	24.07	23.87	23.26	22.29	21.04	19.57
UPPER SURFACE												
.00	-7.38	-8.86	-10.34	-9.99	-2.40	-1.88	-1.79	-1.53	-1.18	-1.09	-.83	-.74
.01	-10.67	-12.50	-13.93	-13.32	-2.75	-1.74	-1.53	-1.47	-1.20	-.99	-1.06	-1.26
.02	-7.50	-8.47	-8.86	-7.79	-2.68	-1.55	-1.38	-1.43	-1.09	-.92	-.92	-1.15
.05	-4.54	-5.10	-5.23	-3.92	-2.93	-1.44	-1.53	-1.50	-1.19	-.97	-.91	-1.06
.10	-3.14	-3.25	-3.31	-3.36	-2.82	-1.56	-1.67	-1.34	.56	-.52	-.57	-.68
.15	-2.52	-2.71	-2.80	-3.22	-3.22	-2.29	-2.47	-2.10	.98	-1.35	-1.07	-1.26
.20	-1.88	-1.98	-2.04	-2.51	-2.67	-1.85	-1.88	-1.44	-.37	-1.03	-.90	-1.00
.25	-1.62	-1.74	-1.80	-2.27	-2.71	-1.86	-1.83	-1.51	-.53	-1.09	-.98	-.98
.35	-1.33	-1.36	-1.46	-1.74	-2.47	-2.00	-1.65	-1.40	-.63	-1.24	-1.17	-.92
.45	-.87	-.97	-.97	-1.11	-2.06	-1.85	-1.36	-1.18	-.37	-1.18	-.94	-.72
.60	-.58	-.68	-.75	-.82	-1.20	-2.12	-1.47	-1.30	-.51	-1.30	-.99	-.65
.75	-.42	-.46	-.53	-.68	-.82	-1.73	-1.80	-1.37	-.42	-1.33	-1.15	-.79
.90	-.72	-.82	-.85	-1.01	-1.18	-1.57	-1.96	-1.57	-1.47	-1.47	-1.37	-1.27
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-7.38	-8.86	-10.34	-9.99	-2.40	-1.88	-1.79	-1.53	-1.18	-1.09	-.83	-.74
.01	-2.67	-3.59	-4.42	-4.10	-1.12	-.80	-.43	-.20	.16	.29	.52	.52
.02	.08	-.22	-.45	-.38	.39	.51	.58	.78	.78	.82	.85	.82
.05	.95	.91	.95	1.02	1.02	1.02	1.02	1.05	.91	.87	.84	.80
.10	.91	.94	1.04	1.07	1.04	.91	.81	.81	.75	.65	.56	.53
.15	.92	.96	1.03	1.10	1.06	.96	1.06	.78	.61	.61	.44	.44
.20	.82	.82	.85	.88	.88	.79	.63	.60	.53	.44	.31	.28
.25	.57	.62	.76	.73	.68	.57	.46	.41	.27	.30	.17	.11
.35	.46	.52	.58	.64	.55	.40	.32	.29	.17	.11	0.00	-.03
.45	.39	.42	.48	.48	.45	.29	.17	.17	.01	-.01	-.07	-.13
.60	.32	.32	.36	.36	.36	.18	.03	.03	-.07	-.11	-.22	-.18
.75	.25	.22	.22	.25	.13	-.03	-.17	-.15	-.23	-.23	-.35	-.32
.90	.13	.10	.10	.10	0.00	-.27	-.44	-.33	-.41	-.49	-.55	-.44
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 82   K = .1589   DELT AA = 6.08   MEAN AA = 18.00

AA X/C	18.00	16.42	14.96	13.70	12.73	12.12	11.92	12.12	12.73	13.69	14.95	16.42
UPPER SURFACE												
.00	-.92	-1.09	-.83	-.66	-.66	-.92	-1.18	-1.62	-2.32	-3.19	-4.23	-5.72
.01	-1.94	-2.28	-2.89	-2.62	-2.62	-2.89	-3.29	-4.17	-4.99	-6.14	-7.36	-8.85
.02	-1.32	-2.00	-2.45	-2.11	-2.34	-2.51	-2.97	-3.48	-3.65	-4.84	-5.63	-6.42
.05	-1.31	-1.09	-1.62	-1.65	-1.47	-1.68	-2.12	-2.49	-2.80	-3.18	-3.61	-3.98
.10	-.25	-1.07	-.74	-.63	-.74	-.96	-1.45	-1.72	-1.72	-2.27	-2.49	-2.76
.15	-1.54	-1.40	-.88	-.74	-.74	-1.02	-1.35	-1.54	-1.77	-1.96	-2.15	-2.38
.20	-1.09	-.87	-.68	-.37	-.62	-.62	-.87	-1.09	-1.31	-1.44	-1.57	-1.69
.25	-1.09	-.80	-.74	-.65	-.62	-.48	-.74	-1.09	-1.15	-1.30	-1.48	-1.51
.35	-1.08	-.73	-.82	-.79	-.73	-.57	-.51	-.76	-.67	-1.08	-1.14	-1.27
.45	-.79	-.58	-.62	-.65	-.58	-.30	-.51	-.41	-.58	-.65	-.79	-.83
.60	-.68	-.65	-.41	-.65	-.65	-.51	-.34	-.48	-.34	-.48	-.61	-.58
.75	-.75	-.71	-.46	-.60	-.64	-.64	-.24	-.42	-.31	-.31	-.39	-.39
.90	-1.08	-1.11	-.91	-.78	-.91	-.82	-.85	-.72	-.82	-.65	-.69	-.69
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-.92	-1.09	-.83	-.66	-.66	-.92	-1.18	-1.62	-2.32	-3.19	-4.23	-5.72
.01	.48	.66	.75	.71	.94	.80	.57	.39	.16	-.29	-.98	-1.67
.02	.89	1.09	.89	.93	.89	.89	.89	.85	.82	.74	.70	.39
.05	.76	.87	.76	.69	.69	.87	.65	.87	.87	.91	.98	1.02
.10	.46	.43	.56	.37	.33	.30	.40	.49	.62	.69	.75	.81
.15	.61	.40	.33	.33	.30	.40	.37	.47	.61	.61	.71	.78
.20	.22	.22	.19	.09	.19	.12	.25	.31	.41	.44	.53	.63
.25	.06	.06	.03	-.01	.06	.03	.08	.19	.25	.30	.38	.38
.35	-.05	-.03	-.08	-.03	-.03	-.03	0.00	.08	.20	.26	.29	.35
.45	-.16	-.13	-.13	-.04	-.04	-.01	-.01	.05	.17	.20	.23	.26
.60	-.18	-.18	-.14	-.14	-.03	-.03	.03	.07	.07	.14	.21	.21
.75	-.29	-.26	-.23	-.20	-.15	-.06	-.03	0.00	.04	.10	.10	.16
.90	-.38	-.33	-.22	-.22	-.16	-.11	-.08	.02	.04	.04	.04	.04
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 83 K = .1910 DELT AA = 6.11 MEAN AA = 18.00

AA / X/C	18.00	19.58	21.05	22.32	23.29	23.90	24.10	23.90	23.29	22.32	21.05	19.58
UPPER SURFACE												
.00	-6.94	-8.68	-10.08	-11.39	-8.16	-2.49	-2.84	-2.40	-1.79	-14.27	-.74	-1.01
.01	-10.07	-12.10	-13.79	-14.74	-8.17	-1.74	-2.21	-1.67	-1.53	-1.26	-.99	-1.06
.02	-7.16	-8.18	-8.98	-8.98	-5.12	-1.89	-2.06	-1.60	-1.49	-1.15	-.75	-.92
.05	-4.42	-4.92	-5.26	-4.92	-3.95	-2.27	-2.06	-1.65	-1.56	-1.19	-.88	-1.00
.10	-2.92	-3.20	-3.25	-3.31	-3.85	-2.49	-2.00	-1.72	-1.50	-1.01	-.57	-.68
.15	-1.77	-1.91	-2.15	-3.55	-4.67	-3.32	-2.75	-2.61	-2.61	-2.15	-1.77	-1.87
.20	-1.76	-1.94	-2.04	-2.16	-3.14	-2.76	-2.32	-1.63	-1.47	-1.22	-1.00	-1.03
.25	-1.59	-1.68	-1.74	-2.07	-2.80	-2.66	-2.27	-1.59	-1.65	-1.15	-.98	-.71
.35	-1.24	-1.33	-1.36	-1.49	-1.93	-2.54	-2.35	-1.62	-1.59	-1.30	-1.30	-.98
.45	-.79	-.87	-.97	-.97	-1.36	-2.03	-2.13	-1.32	-1.43	-1.36	-1.29	-.90
.60	-.51	-.54	-.48	-.72	-.72	-1.57	-1.57	-1.57	-1.30	-1.09	-1.20	-.89
.75	-.35	-.39	-.53	-.57	-.68	-.75	-1.91	-2.13	-1.37	-.97	-1.04	-.82
.90	-.69	-.72	-.85	-.91	-1.04	-1.21	-1.44	-1.80	-1.73	-1.40	-1.24	-1.18
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-6.94	-8.68	-10.08	-11.39	-8.16	-2.49	-2.84	-2.40	-1.79	-14.27	-.74	-1.01
.01	-2.49	-3.64	-4.51	-5.06	-3.55	-1.39	-1.25	-.52	-.06	3.41	.29	.52
.02	.12	-.30	-.53	-.80	-.22	.23	.31	.51	.78	.78	.78	.82
.05	.91	.84	.87	.80	.95	.91	.95	.87	.87	.84	.73	.76
.10	.81	.85	.88	.91	.94	.94	.91	.72	.62	.59	.53	.49
.15	.82	.89	.92	.96	.96	.96	.92	.75	.61	.58	.44	.40
.20	.69	.76	.79	.79	.85	.79	.72	.50	.44	.38	.35	.28
.25	.52	.57	.60	.60	.65	.65	.54	.33	.27	.22	.17	.11
.35	.40	.43	.46	.49	.49	.46	.40	.20	.08	.05	0.00	-.03
.45	.33	.36	.36	.36	.36	.26	.26	.08	-.04	-.04	-.07	-.07
.60	.21	.25	.25	.21	.25	.25	.10	-.07	-.18	-.22	-.18	-.22
.75	.13	.16	.13	.13	.10	.07	-.06	-.32	-.38	-.32	-.32	-.29
.90	.04	.04	.02	0.00	-.06	-.14	-.27	-.49	-.57	-1.18	-.38	-.36
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 83 K = .1910 DELT AA = 6.11 MEAN AA = 18.00

AA / X/C	18.00	16.42	14.94	13.68	12.70	12.09	11.89	12.09	12.70	13.67	14.94	16.41
						UPPER SURFACE						
.00	-.83	-1.44	-1.53	-1.44	1.79	-1.97	-2.23	-2.58	-3.19	-3.89	-5.02	-6.15
.01	-1.13	-2.35	-3.09	-3.77	-4.11	-4.51	-4.72	-5.19	-5.94	-6.88	-6.37	-9.66
.02	-.98	-2.00	-2.62	-2.97	-3.53	-3.59	-3.93	-4.27	-4.72	-5.29	-6.14	-6.99
.05	-1.00	-1.40	-1.37	-1.93	-2.46	-2.59	-2.74	-2.71	-3.14	-3.08	-3.89	-4.23
.10	-.74	-1.45	-1.01	-1.01	-1.67	-1.72	-1.94	-.25	-2.16	-1.89	-2.71	-2.76
.15	-1.63	-1.87	-1.49	-1.30	-1.30	-1.35	-.65	-.42	-.93	-1.07	-1.26	-1.40
.20	-1.06	-1.06	-1.06	-.81	-1.00	-1.19	-1.25	-1.31	-1.38	-1.50	-1.57	-1.72
.25	-1.01	-.92	-1.03	-.83	-.80	-1.09	-1.15	-1.18	-1.30	-1.36	-1.48	-1.57
.35	-1.24	-.79	-.79	-.79	-.70	-.86	-.98	-1.01	-1.08	-1.14	-1.17	-1.24
.45	-1.11	-.51	-.30	-.44	-.41	-.51	-.62	-.62	-.72	-.72	-.76	-.79
.60	-.92	-.51	-.37	-.20	-.03	-.34	-.37	-.44	-.48	-.48	-.51	-.54
.75	-.79	-.71	-.39	-.10	-.28	-.20	-.31	-.39	-.35	-.35	-.31	-.31
.90	-1.04	-1.21	-.78	-.56	-.65	-.62	-.69	-.65	-.65	-.65	-.65	-.65
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-.83	-1.44	-1.53	-1.44	-1.79	-1.97	-2.23	-2.58	-3.19	-3.89	-5.02	-6.15
.01	.43	.39	.48	.29	.25	.20	.11	-.06	-.34	-.75	-1.44	-2.08
.02	.85	.89	.89	.78	.82	.89	.82	.70	.66	.66	.47	.23
.05	.73	.69	.65	.65	.69	.69	.76	.80	.84	.57	.91	.95
.10	.49	.43	.43	.43	.40	.43	.46	.56	.62	.69	.75	.81
.15	.40	.40	.37	.37	.40	.40	.44	.51	.58	.61	.68	.82
.20	.22	.19	.16	.16	.19	.22	.28	.35	.41	.47	.60	.66
.25	.11	.06	.06	.06	.08	.08	.17	.25	.27	.38	.41	.52
.35	-.05	-.05	-.05	-.03	0.00	.02	.02	.17	.23	.29	.37	.37
.45	-.13	-.13	-.13	-.07	-.07	-.01	.01	.11	.14	.20	.23	.36
.60	-.18	-.18	-.11	-.11	-.11	0.00	-.07	.10	.07	.21	.21	.25
.75	-.26	-.20	-.15	-.12	-.09	-.06	-.03	.07	.02	.10	.10	.13
.90	-.36	-.22	-.19	-.11	-.08	-.03	-.03	.04	.04	.07	.04	.10
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 84 K = .2279 DELT AA = 6.13 MEAN AA = 18.00

AA / X/C	18.00	19.58	21.06	22.33	23.30	23.92	24.12	23.92	23.30	22.33	21.06	19.58
UPPER SURFACE												
.00	-6.59	-8.07	-9.73	-10.95	-9.64	-2.49	-2.23	-2.40	-1.09	-1.01	-1.36	-1.27
.01	-10.00	-11.49	-13.86	-15.01	-11.28	-5.26	-1.53	-2.21	-1.67	-1.20	-1.60	-1.94
.02	-7.16	-8.01	-8.86	-9.15	-6.59	-3.65	-1.94	-2.23	-.98	-1.09	-.81	-1.55
.05	-4.39	-4.76	-5.20	-5.23	-4.20	-3.58	-2.09	-1.78	-1.59	-1.06	-1.40	-1.28
.10	-2.98	-3.09	-3.25	-3.36	-4.07	-4.13	-2.43	-3.03	-1.78	-.74	-.96	-.79
.15	-1.63	-1.77	-2.47	-4.48	-4.91	-4.34	-3.74	-3.78	-3.41	-2.05	-2.05	-1.91
.20	-1.79	-1.88	-2.01	-2.29	-2.57	-3.24	-2.92	-2.04	-1.88	-1.38	-1.16	-1.19
.25	-1.59	-1.68	-1.74	-1.89	-2.27	-3.04	-2.36	-1.86	-1.83	-1.59	-1.21	-1.27
.35	-1.27	-1.30	-1.36	-1.46	-1.59	-2.22	-2.82	-1.71	-1.55	-1.62	-1.24	-1.05
.45	-.83	-.87	-.90	-.94	-1.01	-1.39	-2.52	-1.71	-1.25	-1.29	-1.11	-.97
.60	-.58	-.58	-.58	-.61	-.68	-.54	-1.30	-1.88	-1.47	-1.16	-1.09	-.99
.75	-.35	-.35	-.42	-.49	-.53	-.64	-.79	-1.29	-1.55	-1.55	-1.18	-.75
.90	-.69	-.75	-.72	-.85	-.88	-.98	-1.01	-1.31	-1.86	-1.80	-1.63	-1.24
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-6.59	-8.07	-9.73	-10.95	-9.64	-2.49	-2.23	-2.40	-1.09	-1.01	-1.36	-1.27
.01	-2.40	-3.36	-4.23	-4.97	-3.91	-1.48	-1.07	-.70	.20	.16	.16	.39
.02	.23	-.03	-.42	-.69	-.45	.43	.43	.70	.85	.89	.89	1.01
.05	1.09	1.05	.98	1.02	1.05	1.20	1.13	1.16	1.09	.95	.95	.95
.10	1.00	1.07	1.10	1.07	1.13	1.13	1.07	.97	.81	.78	.69	.65
.15	1.03	1.06	1.10	1.10	1.16	1.10	1.10	1.06	.82	.68	.71	.58
.20	.82	.85	.94	.98	1.01	.98	.94	.79	.63	.44	.44	.38
.25	.68	.68	.76	.79	.81	.79	.73	.57	.44	.30	.27	.22
.35	.58	.61	.64	.67	.73	.67	.55	.43	.20	.17	.14	.05
.45	.57	.48	.54	.57	.57	.54	.48	.36	.26	.05	-.01	.01
.60	.40	.40	.43	.43	.47	.40	.36	.07	.14	-.07	-.14	-.11
.75	.27	.27	.33	.30	.27	.25	.19	-.09	-.23	-.20	-.26	-.26
.90	.21	.21	.21	.18	.13	.10	.04	-.30	-.52	-.41	-.38	-.33
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 84 K = .2279 DELT AA = 6.13 MEAN AA = 18.00

AA	18.00	16.41	14.93	13.66	12.69	12.07	11.87	12.07	12.69	13.66	14.93	16.41
X/C												
UPPER SURFACE												
.00	-.74	-.92	-1.01	-1.01	-.74	-.74	-.74	-1.44	-1.97	-2.75	-3.80	-5.11
.01	-1.33	-1.94	-2.96	-3.09	-2.89	-2.96	-3.16	-3.63	-4.58	-5.53	-7.09	-8.31
.02	-1.15	-1.38	-2.51	-2.11	-2.51	-2.51	-2.85	-3.19	-3.87	-4.38	-5.40	-6.25
.05	-1.19	-1.28	-1.65	-1.68	-1.78	-1.84	-2.03	-2.09	-2.62	-2.99	-3.49	-3.89
.10	-.79	-1.29	-1.45	-.63	-.90	-1.07	-1.23	-1.72	-1.89	-2.16	-2.43	-2.60
.15	-1.87	-1.54	-1.07	-1.54	-1.26	-1.68	.28	-.18	-.51	-.60	-.88	-.98
.20	-1.13	-1.19	-1.16	-.94	-.72	-.72	-.75	-1.00	-1.22	-1.31	-1.41	-1.60
.25	-1.27	-1.15	-1.21	-.95	-.71	-.74	-.62	-.89	-1.12	-1.27	-1.39	-1.51
.35	-1.27	-1.05	-.92	-.86	-.79	-.79	-.48	-.60	-.92	-1.01	-1.11	-1.20
.45	-.97	-.79	-.51	-.51	-.65	-.62	-.51	-.27	-.44	-.62	-.62	-.79
.60	-.85	-.68	-.54	-.48	-.54	-.51	-.48	-.37	-.41	-.37	-.48	-.51
.75	-.71	-.79	-.53	-.39	-.39	-.46	-.64	-.28	-.35	-.35	-.20	-.24
.90	-1.11	-1.08	-.88	-.88	-.69	-.75	-.88	-.88	-.75	-.78	-.69	-.69
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-.74	-.92	-1.01	-1.01	-.74	-.74	-.74	-1.44	-1.97	-2.75	-3.80	-5.11
.01	.61	.61	.71	.66	.80	.75	.84	.57	.25	-.02	-.75	-1.53
.02	.97	.93	.97	.93	.93	1.32	1.01	.97	1.01	.93	.82	.58
.05	.84	.87	.80	.76	.73	.73	.87	.84	.95	1.02	1.09	1.13
.10	.59	.49	.46	.40	.43	.46	.53	.56	.69	.78	.85	.91
.15	.51	.47	.40	.40	.44	.44	.47	.51	.61	.75	.85	.96
.20	.31	.28	.22	.16	.22	.28	.31	.35	.44	.57	.66	.76
.25	.17	.17	.08	.06	.11	.11	.17	.22	.35	.44	.49	.54
.35	.05	0.00	-.03	-.03	.02	0.00	.08	.14	.23	.40	.43	.52
.45	-.04	-.04	-.07	-.04	-.01	-.04	.05	.08	.20	.29	.33	.42
.60	-.11	-.11	-.11	-.11	-.07	0.00	.03	.07	.18	.29	.32	.36
.75	-.20	-.17	-.17	-.15	-.06	-.06	-.03	.02	.10	.16	.22	.30
.90	-.27	-.22	-.19	-.11	-.06	-.08	-.08	-.03	.15	.15	.13	.21
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 85   K = .2664   DELT AA = 6.17   MEAN AA = 18.00

AA X/C	18.00	19.59	21.08	22.36	23.34	23.95	24.16	23.95	23.34	22.36	21.08	19.59
						UPPER SURFACE						
.00	-5.63	-7.11	-8.77	-10.25	-11.04	-6.94	-2.84	-1.79	-1.79	-1.27	-.92	-.66
.01	-8.98	-11.22	-13.32	-14.60	-13.32	-5.33	-2.14	-1.53	-1.40	-1.26	-.92	-.92
.02	-6.59	-7.79	-8.64	-9.09	-7.56	-4.67	-2.45	-1.60	-1.43	-.98	-.75	-.92
.05	-4.01	-4.67	-5.13	-5.20	-4.33	-4.82	-3.33	-2.06	-1.40	-1.22	-.88	-1.00
.10	-2.65	-3.03	-3.20	-3.31	-3.74	-4.40	-3.47	-3.58	-1.34	-1.34	-.68	-.63
.15	-1.54	-1.73	-2.29	-3.50	-5.79	-4.95	-5.93	-4.20	-3.55	-3.18	-2.47	-1.49
.20	-1.63	-1.79	-1.91	-2.07	-2.35	-2.70	-3.39	-2.83	-2.39	-.75	-.40	-.09
.25	-1.51	-1.65	-1.71	-1.83	-1.98	-2.39	-3.54	-3.45	-2.77	-2.63	-2.33	-2.12
.35	-1.17	-1.24	-1.30	-1.36	-1.43	-1.59	-2.41	-3.04	-2.38	-1.81	-1.20	-.98
.45	-.72	-.79	-.83	-.87	-.94	-.97	-1.64	-2.52	-2.41	-1.78	-.94	-.83
.60	-.41	-.48	-.58	-.68	-.65	-.65	-.78	-1.54	-2.54	-2.16	-1.47	-.89
.75	-.39	-.46	-.46	-.57	-.60	-.57	-.60	-.64	-1.15	-1.98	-1.87	-1.40
.90	-.10	-.07	-.10	-.13	-.20	-.39	-.36	-.26	-.46	-.91	-1.70	-1.31
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
						LOWER SURFACE						
.00	-5.63	-7.11	-8.77	-10.25	-11.04	-6.94	-2.84	-1.79	-1.79	-1.27	-.92	-.66
.01	-1.94	-2.81	-2.08	-4.60	-4.83	-2.81	-1.25	-.80	-.43	.20	.34	.57
.02	.43	.08	-.26	-.57	-.73	0.00	.51	.58	.74	1.09	.85	.85
.05	1.09	1.27	1.16	.98	1.02	1.13	1.20	1.13	1.05	1.05	.98	.87
.10	1.00	.97	.97	1.07	1.10	1.13	1.10	1.00	.97	.85	.65	.62
.15	.99	1.03	1.13	1.13	1.16	1.16	1.13	1.06	.99	.85	.61	.54
.20	.79	.88	.91	.94	.94	1.01	.94	.82	.79	.60	.41	.35
.25	.65	.68	.71	.71	.76	.79	.73	.65	.54	.44	.19	.17
.35	.52	.61	.61	.64	.64	.64	.61	.55	.40	.20	.05	.11
.45	.48	.48	.51	.51	.51	.57	.51	.39	.29	.11	-.04	.05
.60	.36	.36	.36	.36	.36	.36	.29	.21	.10	-.11	-.22	-.33
.75	.27	.27	.25	.27	.25	.25	.16	.07	0.00	-.23	-.38	-.32
.90	.15	.13	.13	.13	.13	.04	0.00	-.03	-.16	-.47	-.63	-.49
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INSTANTANEOUS PRESSURE COEFFICIENTS

RUN NO 85 K = .2664 DELT AA = 6.17 MEAN AA = 18.00

AA	18.00	16.40	14.91	13.63	12.65	12.04	11.83	12.03	12.65	13.63	14.91	16.40
X/C												
UPPER SURFACE												
.00	-.31	-.31	-.31	-.48	-.57	-.74	-.83	-1.18	-1.70	-2.40	-3.27	-4.58
.01	-1.06	-.99	-1.67	-2.21	-2.68	-2.89	-3.29	-3.77	-4.51	-5.33	-6.54	-7.90
.02	-1.04	-.87	-1.09	-1.38	-2.40	-2.74	-2.91	-3.19	-3.70	-4.27	-4.95	-5.97
.05	-.97	-.81	-.85	-1.09	-1.47	-1.99	-2.15	-2.37	-2.62	-2.96	-3.11	-3.86
.10	-.63	-.47	-.41	-.25	-.52	-1.12	-1.39	-1.61	-1.89	-2.00	-1.89	-1.72
.15	-1.35	-1.30	-.74	-1.16	-.93	-3.97	-1.68	-1.63	-1.02	-2.24	-1.68	-.93
.20	-.97	-.84	-.78	-.75	-.62	-.72	-.90	-1.06	-1.22	-1.31	-1.44	-1.60
.25	-1.01	-.92	-.83	-.80	-.83	-.68	-.86	-1.01	-1.15	-1.27	-1.36	-1.48
.35	-.98	-.89	-.79	-.76	-.82	-.73	-.63	-.79	-.89	-1.01	-1.08	-1.20
.45	-.79	-.79	-.72	-.65	-.51	-.65	-.41	-.41	-.51	-.58	-.65	-.62
.60	-.68	-.58	-.58	-.58	-.41	-.48	-.41	-.30	-.34	-.34	-.37	-.48
.75	-.97	-.57	-.57	-.68	-.49	-.31	-.57	-.39	-.35	-.10	-.31	-.31
.90	-.78	-.26	-.20	-.16	-.20	-.10	-.07	0.00	.02	.09	.15	.12
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LOWER SURFACE												
.00	-.31	-.31	-.31	-.48	-.57	-.74	-.83	-1.18	-1.70	-2.40	-3.27	-4.58
.01	.75	.80	.89	.84	.75	.84	.71	.66	.39	.20	-.61	-1.35
.02	1.01	.97	.97	.97	.97	.89	.97	.97	1.01	.89	.82	.66
.05	.84	.80	.76	.76	.76	.80	.80	.84	.95	1.02	1.05	1.09
.10	.56	.49	.46	.46	.46	.53	.46	.62	.69	.75	.85	.97
.15	.54	.47	.47	.40	.40	.44	.44	.47	.58	.78	.85	.96
.20	.35	.28	.25	.22	.25	.25	.31	.35	.47	.57	.76	.76
.25	.14	.11	.11	.11	.11	.14	.17	.22	.30	.38	.49	.57
.35	.02	.02	0.00	.02	.02	.05	.11	.17	.29	.37	.43	.55
.45	-.04	-.01	-.04	-.04	-.01	.01	.05	.08	.20	.33	.39	.45
.60	-.18	-.11	-.14	-.11	-.07	0.00	0.00	.03	.14	.21	.29	.32
.75	-.26	-.17	-.15	-.12	-.03	0.00	0.00	.04	.13	.19	.22	.27
.90	-.27	-.19	-.14	-.14	-.16	-.08	0.00	.04	.10	.13	.15	.21
1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Unclassified

Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) Wind Tunnel Operations Department University of Maryland College Park, Maryland	2a. REPORT SECURITY CLASSIFICATION Unclassified 2b. GROUP

3. REPORT TITLE

MEASUREMENTS OF AERODYNAMIC FORCES ON AN OSCILLATING AIRFOIL

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

Final Report

5. AUTHOR(S) (First name, middle initial, last name)

Richard I. Windsor

6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
March 1970	237	38

8a. CONTRACT OR GRANT NO. DAAJ02-67-C-0017 b. PROJECT NO. Task 1F162204A13903 c. d.	9a. ORIGINATOR'S REPORT NUMBER(S) USAAVLABS Technical Report 69-98 9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) University of Maryland Wind Tunnel Engineering Report 70-1

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13. ABSTRACT

A literature survey was conducted to determine the state of the art of measuring and predicting aerodynamic characteristics of oscillating airfoils. Results of this survey are presented as a correlation and tabulation of airfoil and finite wing experimental investigations. An extensive bibliography resulting from the literature survey is also presented.

Aerodynamic forces on a two-dimensional NACA 0012 airfoil oscillating sinusoidally in pitch were measured by two techniques. The forces were obtained from pressure measurements and by means of strain gage balances. Pressure measurements were made on the airfoil oscillating in pitch about the quarter-chord point at various mean angles of attack. Strain gage balance readings were obtained for models with pitch axis located at 25, 37, and 50 percent chord points oscillating about various mean angles. Test results obtained by the two measuring techniques have been compared with one another, with incompressible thin airfoil theory, and with previous experimental oscillating airfoil investigations.

Instantaneous pressure distributions are presented for representative oscillating conditions.

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Security Classification

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Airfoil						
Symmetrical Profile						
Pitching Oscillation						

Unclassified

Security Classification

2593-70